BIOLOG

OmniLog® ID System

User Guide

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OmniLog ID Data Collection Software, Release 1.3

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1. Introducing the OmniLog ID System

In this section:
➔How It Works
➔The Identification Process
➔Easy-to-Use Software
➔User Functions
➔Using the Footer Bar
➔The Math Behind the Software

The OmniLog® ID System includes everything you need to incubate microbes and use all the features of OmniLog ID software. OmniLog ID is a dedicated system for bacterial identification and includes the following components:

- Dedicated Windows®-based computer with preinstalled OmniLog ID software
- OmniLog Incubator/Reader
- Printer
- Turbidimeter
- Electronic multichannel repeating pipettor

OMNILOG ID SYSTEM

OmniLog ID is an easy-to-use yet advanced tool for identifying and characterizing microorganisms. Our combined databases include over 800 species of aerobic bacteria. They contain nearly all of the significant species encountered in diverse practices of microbiology, including pharmaceutical, biotechnology, cosmetic, and medical device companies; veterinary and clinical medicine; agriculture and environmental science; food processing, spoilage, and safety; reference laboratories; industrial microbiology; and research and education.

OmniLog ID continues to expand and evolve to keep pace with progress in the field of microbiology. Every month researchers discover new species of microorganisms and recognize their importance. By using its patented technology with 95 carbon source utilization tests in a microtiter plate format (MicroPlate™), the Biolog microbial identification system can recognize over 4 x 10^{28} possible metabolic patterns. This provides room for future growth of the system, so that the technology will remain state-of-the-art.

How It Works

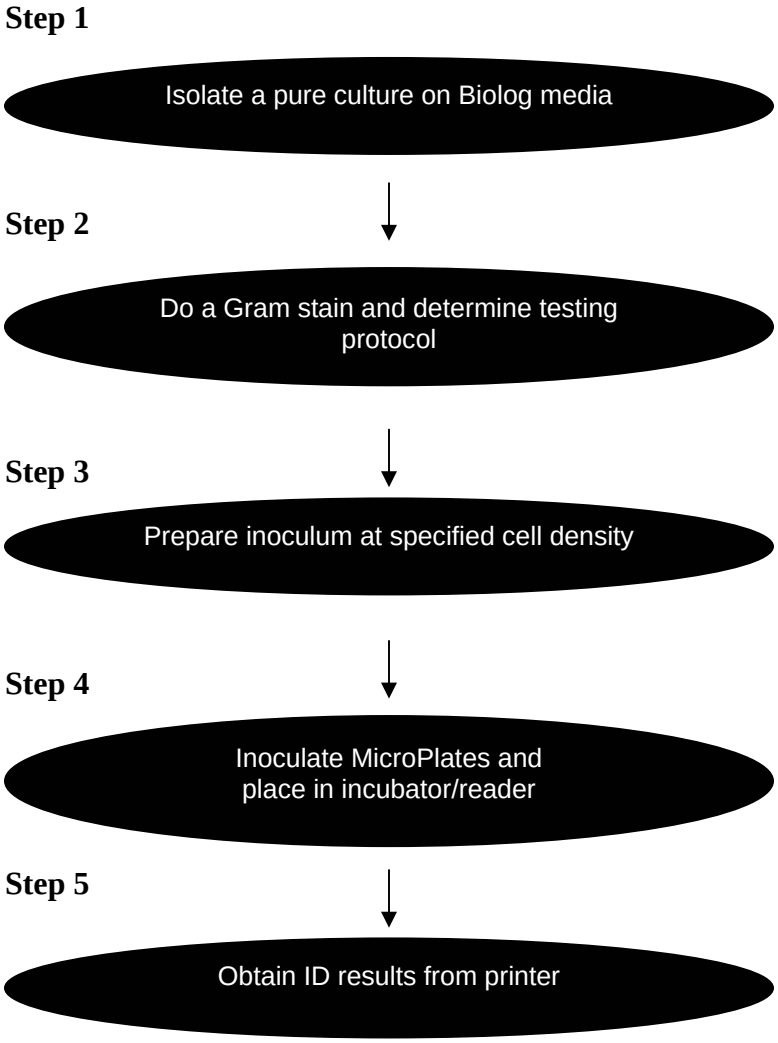
Biolog's innovative patented technology uses each microbe's ability to use particular carbon sources to produce a unique pattern or "fingerprint" for that microbe. As a microorganism begins to use the carbon sources in certain wells of the MicroPlate, it respires. This respiration process reduces a tetrazolium redox dye and those wells turn purple. The end result is a pattern of purple wells on the MicroPlate that is characteristic of that microorganism.

This pattern is readable by a combination incubator/reader instrument, the OmniLog Incubator/Reader. The fingerprint data is fed into OmniLog ID software, which searches its extensive database and can make an identification in seconds. By developing a simple tool that allows 95 simultaneous carbon source utilization tests, Biolog has accomplished its goal of producing an efficient, easy-to-use, powerful, and reliable microbe identification system.

The Identification Process

Microbial identification involves five basic steps. These steps apply to all identifications. A small number of species have peculiarities that may require an extra step or special handling techniques.

The OmniLog ID Microbe Identification Process


Step 1
Isolate a pure culture on Biolog media
Step 2
Do a Gram stain and determine testing protocol
Step 3
Prepare inoculum at specified cell density
Step 4
Inoculate MicroPlates and place in incubator/reader
Step 5
Obtain ID results from printer

Follow directions closely to obtain accurate results.

Step 1: Isolate a pure culture on Biolog media

Isolating a pure culture is not always easy. Bacteria often have sticky surfaces and cells sometimes stick together in clumps. As a first step to accurate microbe identification, streak agar plates using correct techniques to generate well isolated colonies. Always use Biolog-recommended culture media and growth conditions. See Section 5 for full culturing and incubation instructions.

Step 2: Do a Gram stain and determine testing protocol

Proper Gram stain technique and interpretation are the important second step in the ID process. See pages 5.2 and 12.1-12.2.

Step 3: Prepare inoculum at specified cell density

Microbiologists are sometimes trained to prepare cell suspensions in a casual manner, often judging cell density by eye. This practice will not yield accurate and reproducible results. Cell density determines oxygen concentration–a key parameter to control when testing microorganisms in MicroPlates. In addition, Biolog has carefully optimized the required inoculating fluids. Don't deviate from Biolog's inocula preparation directions See pages 5.5- 5.7.

Step 4: Inoculate MicroPlates and place in the OmniLog

Pipet the specified amount of cell suspension into each labeled MicroPlate, put the lid on, and place on trays in incubator/reader. Incubate MicroPlates using the same conditions of temperature and atmosphere used to culture the microorganisms. Organisms requiring a microaerophilic atmosphere (CO_2) need to be incubated off line; in this case, you'll use the incubator/reader for reading only.

Step 5: Obtain ID results from printer

After an appropriate incubation time, OmniLog ID automatically reads each MicroPlate. The patterns formed in the wells are automatically entered into OmniLog ID software, which searches the database and can provide an identification in seconds. The printer automatically issues hardcopy results when an ID is complete.

Easy-to-Use Software

OmniLog ID provides an easy-to-follow visual software interface to lead you through the identification process. You'll spend most of your time using Worksheets, with areas for entering sample identifiers (sample number, strain name, strain number, etc.), loading MicroPlates, viewing current read status, unloading MicroPlates, and viewing microbial identifications.

Once you're familiar with the system, you'll be able to prepare your samples using proper techniques, read MicroPlates in batches, prepare worksheets to organize information, build your own database, and analyze data using the advanced functions built into OmniLog ID software.

Before you use the OmniLog software, you must establish an ADMINISTRATOR user name and password. Please see Section 2, "Installation and Administration".

The *OmniLog ID* (*ID*=Identification) program operates the OmniLog Incubator/Reader and identifies microbes. Use of the *RetroSpect Trending and Tracking Software* program allows the user to edit, compile, manage, and export the data created in the OmniLog ID program. The ID program is structured to move automatically through the incubation and identification process. Navigational tools include tabs to move from window to window, drop-down lists to choose from pre-set choices, selection bars, and fields to type in specific data.

OmniLog ID performs the following functions:

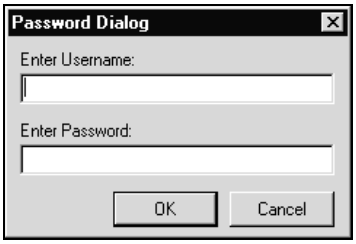
- Guides you through loading and reading MicroPlates using worksheets
- Guides you through unloading all or some MicroPlates when reading is complete
- Identifies microbes and allows you to interpret results

User Functions

Logging In

When the system is operating in Restricted Access mode, all users must log in when attempting to perform certain functions. When a User Logs on to the program for the first time, he or she, will use the User Name and Preliminary password given by the administrator. The program will then automatically prompt them to create their own personal password. This User determined password will be used for subsequent logins.

To Log in to the Program Click on the **Log In** box in the upper right hand corner of the Welcome Screen. The **Password Dialog** will appear once that function is accessed.



PASSWORD DIALOG WINDOW

Changing Users

If the software is already open and it is necessary to change users:

1. Click **Log-Out**. The button will change to **Log In**.
2. Click Log-In. Now, the new user will be allowed to Log in using the normal Log in procedure.
3. A **Password** Dialog window will appear. Enter the new user's name and password. Press Enter.

Logging Out

The Software is designed to automatically Log Out a user after 15 minutes of inactivity, however, to log out during a session:

1. Click the **Log Out** button in the upper right hand corner

Unauthorized Log-In Attempts

If someone enters an incorrect user name and/or password, the software will allow five attempts to enter the information correctly.

Subsequent attempts to open the program and log in using an incorrect user name or password will result in a warning tone and screen message just above the status bar noting, "unauthorized access has been attempted."

The message will remain until the Administrator Logs Into the program and clicks on the warning box.

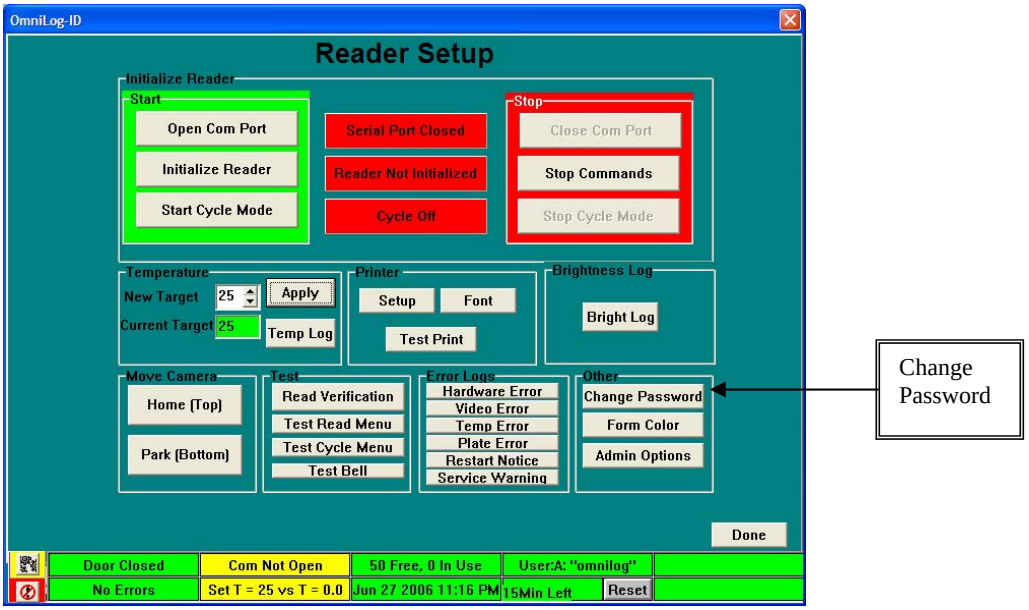
If the Program Administrator cannot Log-In contact Technical Services for assistance.

OmniLog software has a predetermined time-out period. If the program is idle for more than 15 minutes, the software will Log-Out . You can prevent this logging-off by clicking "OK" when the time- out warning appears.

Changing A Password

The Program will require users to change their password every three months, but Users may change their passwords at any time.

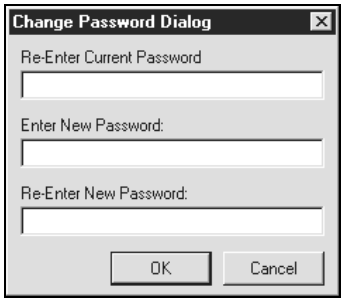
1. Click the **Reader Setup** button on the **Welcome** screen.
2. Click **Change Password** on the bottom right corner of the **Reader Setup** window.



READER SETUP WINDOW

3. In the **Change Password Dialog** window, enter your old password, new password, and new password confirmation.

4. Click **OK**.

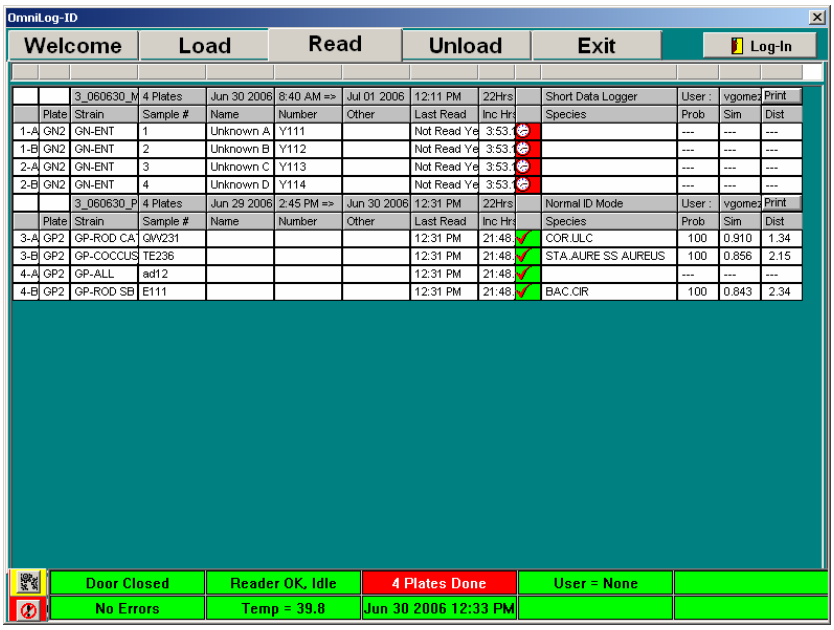


CHANGE PASSWORD DIALOG WINDOW

Loading and Reading MicroPlates

Worksheets are the backbone of OmniLog ID; you'll use them throughout the process of loading and reading MicroPlates. They provide the organizational scheme for managing up to 50 MicroPlates and keeping accurate lists of identifications.

Each batch has its own worksheet. Each worksheet can accommodate information of up to 50 MicroPlates. If you have several batches of MicroPlates in the incubator/reader at the same time, you can view results for all worksheets by scrolling through the list on the Read window.



READ WINDOW (SHOWING STATUS OF BATCHES LOADED)

In order to make sure all worksheet information is correct, OmniLog ID directs you through entering the following information about each MicroPlate in your batch:

- What date am I loading this batch?
- What unique code letter will I assign to this batch?
- Is this plate part of a project, and if so what is the project code?
- When were the MicroPlates set up (zero time for the incubation)?
- Do I want to use normal read mode or a special read mode?

As incubation and reading progress, the worksheets for all MicroPlates in the incubator/reader will remain displayed on the Read window. You'll be able to view in-progress and final results for all MicroPlates and all worksheets. When the ID process ends, you'll automatically receive hardcopy results from your printer.

Interpreting Results

As IDs show up on the Read window, you can view more detailed information for any microbe listed. The Plate Data Window shows a picture of the selected MicroPlates, along with well-by-well readings and statistical information. This information will help you assess the accuracy of the ID or pin down an uncertain ID using similarity index values and distances.

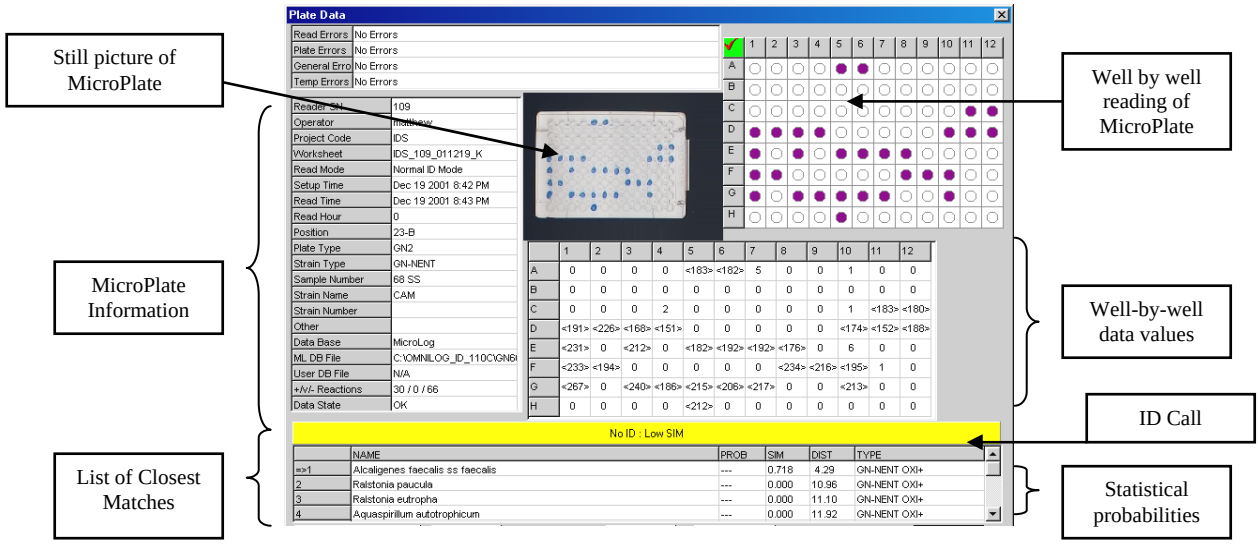
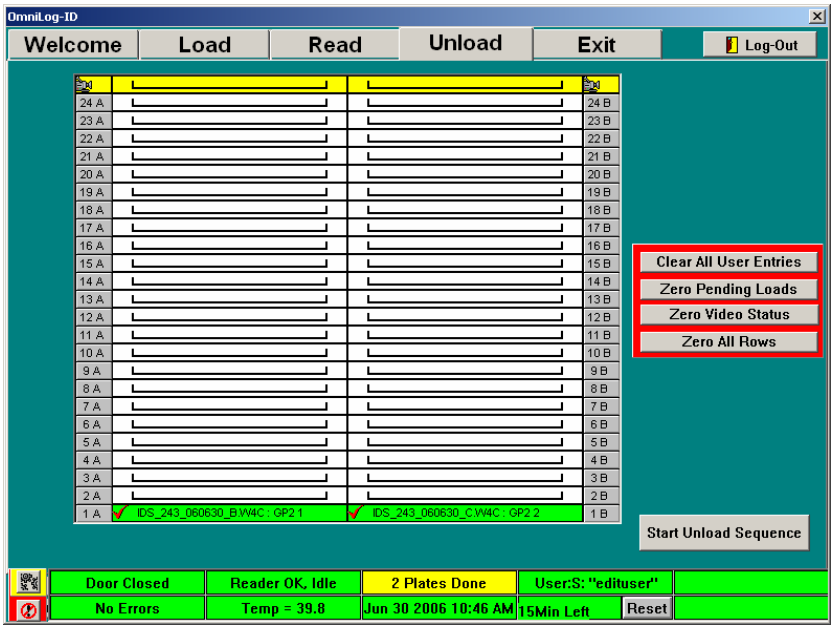


PLATE DATA WINDOW

Unloading MicroPlates

After the ID process is complete, you'll unload MicroPlates. Check the status on the Read window, make sure all the IDs have printed out, remove the MicroPlates, and recheck the status.

The Unload window allows you to easily tell which MicroPlates are ready to be unloaded.



Shows which MicroPlates are ready for unloading

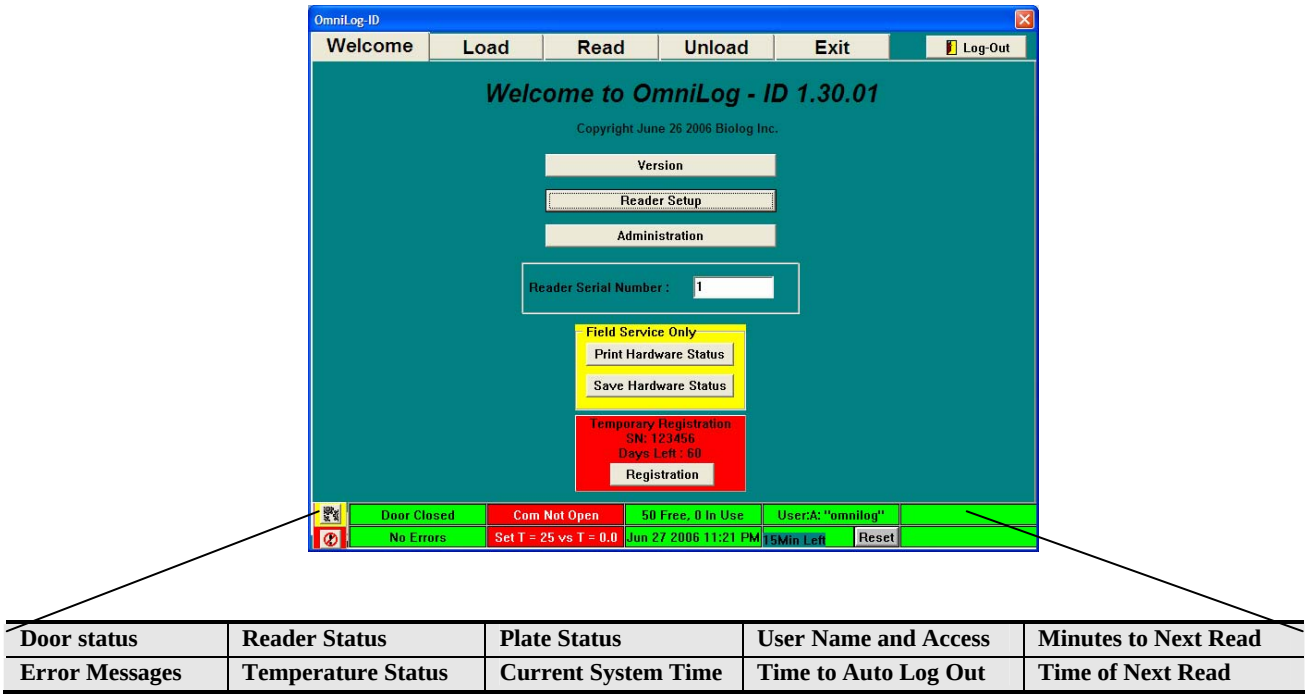
UNLOAD WINDOW

Once you ascertain which MicroPlates have completed the ID process, you simply open the incubator/reader door, remove one tray at a time, take the appropriate MicroPlate(s) out of each tray, replace the tray in the same slot of the incubator/reader, and close the door. If you wish, you can load a new batch while the door is open. The system allows 20 minutes for each load/unload cycle.

Using the Footer Bar

No matter which OmniLog ID window you display, there will always be a footer bar running across the bottom of the window. This offers a handy display of important status indicators, such as time, incubator/reader temperature, and the time until the next reading.

The footer bar consists of ten cells, laid out as follows:



Door status	**Reader Status**	**Plate Status**	**User Name and Access**	**Minutes to Next Read**
Error Messages	**Temperature Status**	**Current System Time**	**Time to Auto Log Out**	**Time of Next Read**

Table 1-1 explains the possible entries in the footer bar cells.

TABLE 1-1. FOOTER BAR ENTRIES

Cell	Message	Color	Meaning
Door Status			
	Door Closed	Green	Incubator/reader door is closed
	Door Open OK	Green	OK to have door open at current menu (When loading and unloading plates)
	Close Door	Yellow/ Green	Close the door to maintain temperature and ensure future incubator/reader movement
	Door Open Error	Red/ Yellow	The incubator/reader cannot move because the door is open
Error Messages			
	Hardware Abort	Red/ Yellow	The incubator/reader is in mechanical failure
	Video Error	Red/ Yellow	The camera failed during reading
	Temperature Error	Red/ Yellow	The temperature is not at target setting while MicroPlates are in the incubator/reader
	Plate Error	Red/ Yellow	A MicroPlate is missing from the read position

Cell	Message	Color	Meaning
	User Cancel	Red/ Yellow	User clicked "Stop Commands" / User time out commands
	Re-trying Contact	Red/ Yellow	The incubator/reader is not responding and the software is trying to re-establish contact
	Logged Auto Auto-Restart	Red/ Yellow	Loss of computer power during read/incubation period. Number of restarts will appear in this box.
Reader Status			
	Reader OK, Idle	Green	The incubator/reader is not moving or reading, cycle on, reader idle.
	Com Not Open	Red/ Yellow	Serial port is not initialized
	Reader Not Initialized	Red/ Yellow	Incubator/reader is not initialized
	Cycle Off	Red/ Yellow	The software is not in cycle mode
	Reader OK, Busy	Yellow/ Green	The incubator/reader is moving or reading, cycle on, reader busy.
	Test Cycle On	Yellow/ Green	Reader is in Test Cyle mode.
Temperature Status			
	Temp – XX.X	Green	This is the current incubator/reader temperature, which is in the target range
	Temp Error	Red/ Yellow	Temperature is out of range; shows actual vs. target temperatures
Plate Status			
	X Free, Y in Use	Green	Number of positions free and number in use
	X Plates Done	Red/ Yellow	Number of MicroPlates ready to remove
Current System Time			
	Date and Time	Green	Date and time from operating system, updated every second (Month/ Day/ Year Hour: Minutes AM/PM)
User Name and Access			
	User: None	Green	No User is currently Logged in to the OmniLog Program
	User:A: "User Name"	Green	User is Logged in to the program. User name appears in this box along with a one letter code signifying that users access level. A: Administrator S: Setup User
	Unrestricted Access	Red	Administrator has set program to Unrestricted Access mode. All Aspects of the software are available to all Users.

Time Until Auto Logout			
	Blank	Green	No User is currently logged into the program
		Green/Red	12 Minutes before auto log-out (15-1 countdown). Reset button resets countdown to 15 minutes. Auto Log-out reset also occurs when program is in use. When box is red there are 5 minutes or less to auto log-out.
Minutes Until Read			
	Blank	Green	No MicroPlates to read OR there are more than 15 minutes until the next reading
	Min to Read 12:30	Green	There are less than 15 but more than 10 minutes to the next read
	Min to Read 9:30	Yellow	There are less than 10 but more than 5 minutes to the next read
	Min to Read 2:30	Red	There are less than 5 minutes to the next read
	Read In Progress	Red	OmniLog is now reading
Time of Next Read			
	Blank	Green	There are no MicroPlates to read OR the next read is in more than 30 minutes
	Next Read X:XX AM/PM	Green	The next read is in less than 30 minutes
	Snooze	Button	The next read is in less than 5 minutes

Caution!

Never turn the software or reader off while the reader is busy. This could result in a mechanical jam that would require Biolog Technical Services to correct.

During normal operation, some of these cells may flash; this occurs because the footer bar cells are constantly updated as the software gets the latest status from the incubator/reader. Color-coding will help you identify the nature of the entry, as follows:

- In their normal "OK" state, the cells will display in black letters on a bright green background.
- Warning messages show as black letters on a yellow/ green flashing background.
- Error messages show as white letters on a red/ yellow flashing background.

Typically all footer cells will be green, with no warning or error messages. However, there are three general situations when the cells will change color and contain warning or error messages, as follows:

Notice Messages

Notice message alert to OmniLog status, but they do not require immediate action or necessarily mean the incubator/reader is not operating normally. Notice messages include:

Cell	Message	Color	What To Do
Door status	Close Door	Yellow/ Green	Close the OmniLog door
Plate Status	X Plates Done	Red/ Yellow	It is time to remove X number of MicroPlates
Temperature Status	Not at Target Temperature	Red/ Yellow	If this occurs when there are no MicroPlates are in the incubator/reader, be sure to change or set temperature when the OmniLog is empty. Wait until the incubator/reader is at the new temperature (this usually takes less than 2 hours) before loading new plates.
Error Message	Com Not Open (Reader) Not Initialized Cycle Off	Red/ Yellow	During normal use, keep the Com port open, the incubator/reader initialized, and the cycle mode on. During system verification testing (see Chapter 13), these error messages may occur.

Reader Busy Messages

Reader Busy messages caution you not to take certain actions because the incubator/reader is reading or about to read. They include:

Cell	Message	Color	What To Do
Minutes Until Read	< 5 minutes OR Read in Progress	Red/ Yellow	Do NOT use the software while the incubator/reader and is busy. Wait until "Reader Idle" appears in the Reader Status cell before you use any software features or try to send any additional commands to the incubator/reader.

Error Messages

Error messages are urgent. They indicate that something has gone wrong and the incubator/reader is not functioning as it should. They include:

Cell	Message	Color	What To Do
Door Status			
	Door Open Error	Red/ Yellow	The incubator/reader is trying to move, but cannot because the door is open. As long as the door is open, the warning bell will ring every second and the "Interrupt" light will illuminate. Close the door and the OmniLog will continue normally.
Error Status			
	Hardware Error	Red/ Yellow	See Section 13
	Temperature Error	Red/ Yellow	See Section 13
	Video Error	Red/ Yellow	See Section 13
	Plate Error	Red/ Yellow	See Section 13
	User Cancel	Red/ Yellow	See Section 13
	Re-trying Contact	Red/ Yellow	See Section 13

If you are unable to clear up any of these errors, call Biolog Technical Services.

The Math Behind the Software

OmniLog ID software uses extensive computer algorithms to take the information from the observed pattern and compare it to the database.

In simple terms, OmniLog ID software rapidly compares the positive-negative-borderline purple pattern in the MicroPlate to the species pattern in the appropriate database. The patterns that most closely match your microbe's pattern are shown on the screen in ranked order. Before making a decision on the result, the software considers the possibility that even the first-ranked choice may not be a good match. It looks to see whether the first choice match is really "close enough" to be acceptable. If not, a "No ID" designation will result.

OmniLog ID uses a newly developed pattern matching method called Progressive ID (PID). This method accurately identifies species patterns by considering the progressive sequence in which purple wells are formed. Typically microorganisms will use their favorite carbon sources most rapidly and completely, resulting in dark purple wells that form quickly. Less-preferred carbon sources are consumed slowly or incompletely, resulting in slower-forming or lighter purple color. The extra information considered by the PID matching method brings a higher level of consistency and accuracy, representing another innovation in Biolog's technology.

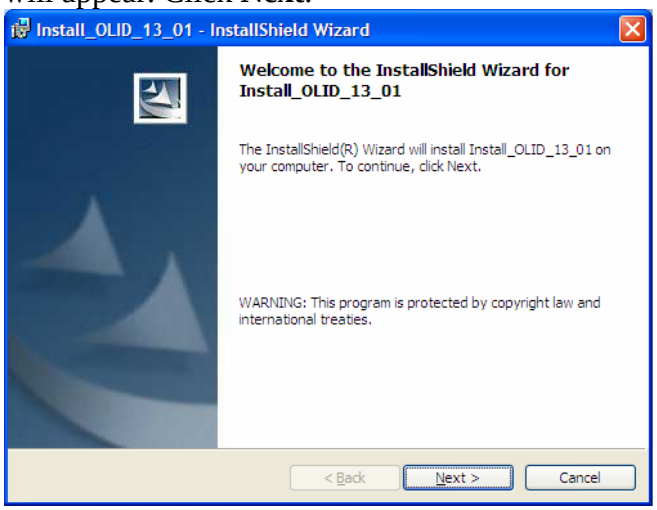
2. Installation and Registration

In this section:

➔**Installing the OmniLog Software**
➔**First Log-In and Setting Up an Administrator**
➔**Registering Your Software**
➔**Installing Biolog 'MicroLog' Databases**

Installing the OmniLog Software

1. Insert the OmniLog Software CD into the CD ROM drive.
2. The OmniLog Software setup Windows® Installer will initialize. This will take a few moments to prepare.
3. The **OmniLog Software – Windows® InstallShield® Wizard** will appear. Click **Next**.


Install_OLID_13_01 - InstallShield Wizard
Welcome to the InstallShield Wizard for Install_OLID_13_01
The InstallShield(R) Wizard will install Install_OLID_13_01 on your computer. To continue, click Next.
WARNING: This program is protected by copyright law and international treaties.
< Back
Next >
Cancel

4. The **License Agreement** will appear. Review the terms and select the '**I accept the terms in the license agreement'** radio button. Click **Next**.
5. Carefully review the **Readme Information**. Click **Next**.
6. The next screen that appears gives you the option of where to install the OmniLog root directory folders:

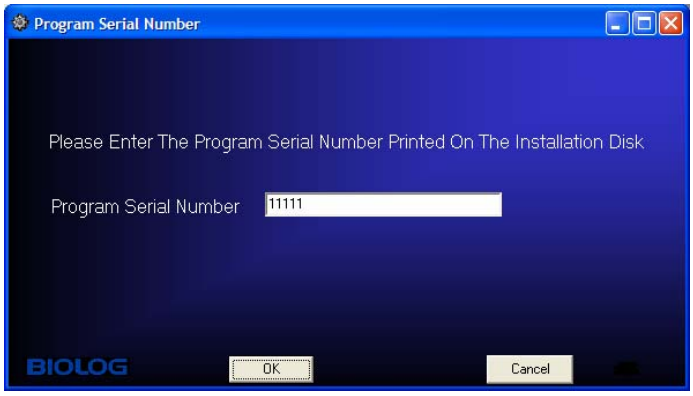
   Destination Folder - The root directory, OmniLog, may be installed anywhere on a stand alone PC or on a network drive. If you do install the directory on a network drive, please remember that this program is currently not designed for multiple users at one time.

   - The default/suggested installation location is \Program Files\Biolog\. Click **Next** to accept this default location.
   - To choose your own location, click **Change**. Select the **Look In** pull down menu to browse for a location. Select the location and click **OK**.

Important!

- *The person installing the software must be logged in through the Windows® operating system as the Administrator.*
- *This version functions only on computers with regional and language options set to English.*

7. Now the **InstallShield® Wizard** is ready to begin installation. Choose **Back** to make any changes, **Cancel** to exit the InstallShield® Wizard and not install the program, or **Install** to proceed with installation.
8. The next screen that appears asks you to enter the serial number of your program (found on the spine of the software jewel case). Enter the **serial number** and click **ok.**



Note:
The Readme Information is not printable at the InstallShield® Wizard window. The file is located in the OmniLog Software root directory and is named *readme.rtf*. Go to this location to open and print the Readme information.

9. The **Installing OmniLog Software** screen will appear while the installation is taking place. Click **Finish** when the InstallShield® Wizard Completed screen appears.

The following shortcut icon will now be installed on your desktop:

The OmniLog shortcut is the main program. Click on this icon to open the main program.

Please remember that the OL DC program will count down for up to 60 days from date of software installation. After 60 days the software will display a User Registration reminder within the program.

First Log-In and Setting up an Administrator

The program is ready to be opened for the first time. The program operates in the Restricted Access Mode that is also available in the MicroStation system. See Section 4: Program Administration.

Restricted Access Mode requires that only the **Program Administrator** oversees and controls who has access to the program. The person who is designated as the Original Program Administrator should perform the first Log-in. This individual then manages who has access to the application and what tasks they can perform. If

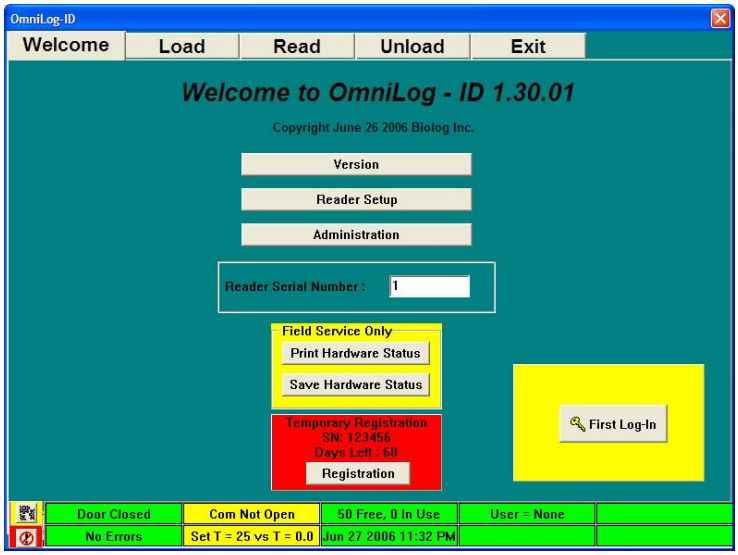
desired, more than one user can be assigned Administrator Privileges on the User List.

The Administrator will:

- Assign User names and passwords for those who will use the system.
- Assign access privileges to each user.

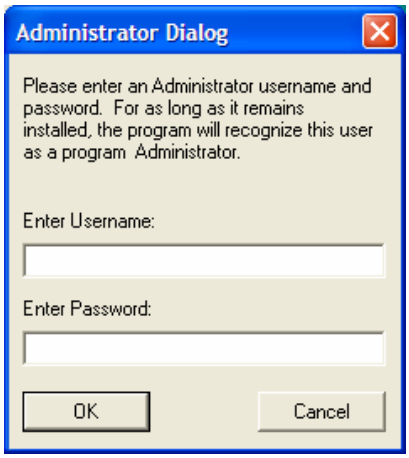
The following steps must be implemented by the user who will act as the program Administrator.

1. Click on the **OmniLog** shortcut icon on your desktop.
2. The **Welcome** screen will appear. Click the **First Log-In** key in the lower right hand corner.



3. The **Administrator Dialog** box will open.
    - Enter a Username that is at least 1 character in length.
    - Enter a Password that is at least 6 characters in length and contains at least one number. *The password is case sensitive*.
4. Click **OK**.
5. When the message "*Click on the Log-In button at the top right to log in to the program*" appears, click **OK**.
6. Click on the **Log In** box located in the upper right hand corner of the **Welcome** window. A **Password Dialog** box will appear.

OmniLog software has a predetermined time-out period. If the program is idle for more than 15 minutes, the software will Log-Out . You can prevent this logging-off by clicking "OK" when the time- out warning appears.


Administrator Dialog
Please enter an Administrator username and password. For as long as it remains installed, the program will recognize this user as a program Administrator.
Enter Username:
Enter Password:
OK
Cancel

7. Enter the Administrator username and password you set in **Step 3**. Click **OK**.
8. You will now be listed as the Original Administrator in the User List with full user privileges. The message in the upper right hand of the Welcome screen will shows the **Log In** button.
9. Click the **Log-In** button to log in. (See Section 1-5 or section 3.1 - 3.3 for Log-In and Reader setup instructions).

Note:
Not all users will have full administrative privileges. To learn more about assigning user names and passwords, as well as setting up different levels of user access, please refer to *Section 4: Program Administration.*

Registering Your Software

Before working with the OmniLog it is important to register the software with Biolog technical service department. By registering the software you become eligible for software upgrades and you will receive regular correspondence from the company.

Note:
There is only 1 registration button access per session. Log-Out and Log-In for additional access.

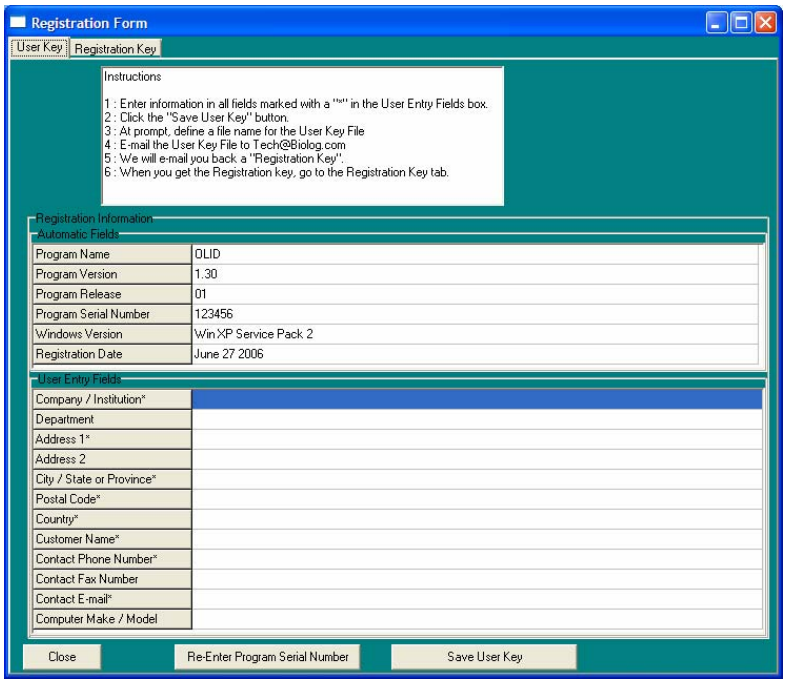
After initial installation, the **Welcome** tab will show **"Temporary Registration Days Left: 60"** in red. The software will count down how many days you have left to register. You must click the **Registration button** to start the registration process.

Registration Process

1. Generate a **User Key** and send to Biolog
2. Load the **Registration Key** from Biolog

Follow the steps outlined below to generate a User Key:

1. At the **Welcome** tab, click on the **Registration** button.
2. The **Registration Form** window appears.

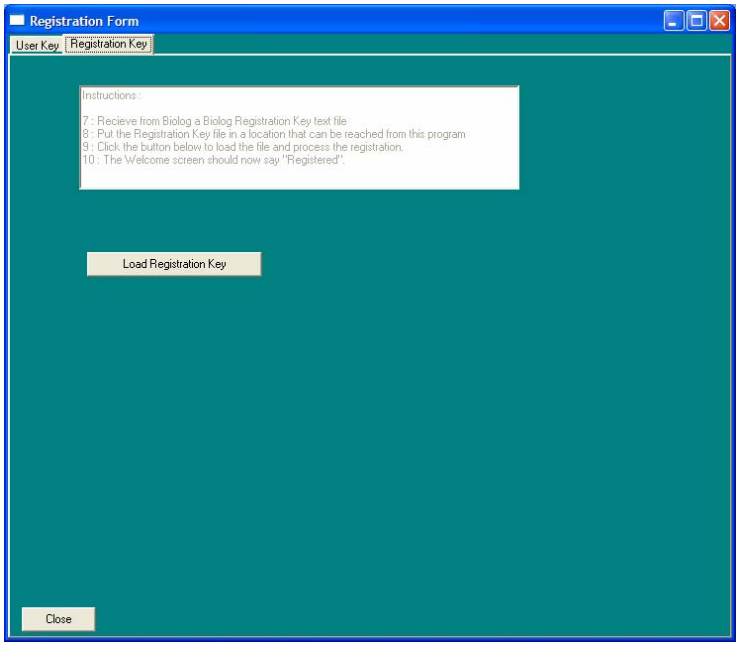


3. Fill out every line of the **Registration Form**. (* Required Fields)
4. Click the **Save User Key** button.
5. A **Save As** window appears. Type a file name for the User Key File in the **File Name** field. The **Save as Type** field should show Text Files as the default file type.
6. Click **Save**. The User Key will be saved as a text file.
7. Click Close.
8. E-mail the User Key File to tech@biolog.com.

- *Each computer requires a separate registration key.*
- *Your registration key should arrive within 48 business hours, providing it is received Monday to Thursday during regular Biolog business hours (M-F 8:30 A.M. – 5:00 P.M. PST).*

Follow the steps outlined below to load the Registration Key:

1. Biolog will e-mail you a Registration Key. Save the attached registration key file on your hard drive **(…Biolog\OLID_XX_XX\certificates)**.
2. Once you have saved your Registration key, open the OmniLog Software program, and click on the **Registration** button to open the **Registration Form**.
3. Click on the **Registration Key** tab that is on the registration form. Then click the **Load Registration Key** button to load the registration key file and process the registration.


Registration Form
User Key
Registration Key
Instructions :
7 : Recieve from Biolog a Biolog Registration Key text file
8 : Put the Registration Key file in a location that can be reached from this program
9 : Click the button below to load the file and process the registration.
10 : The Welcome screen should now say "Registered".
Load Registration Key
Close

4. The Temporary Registration box on the Welcome screen should now read "**Registered**", and turn from red to gray.
5. The Registration Button is no longer present.

Installing Biolog 'MicroLog' Databases

Installing a Biolog 'MicroLog' database

Install databases in any order.

- Gram Negative (GN)
- Gram Positive (GP)
- Dangerous Pathogens (DP)

1. Check to make sure you have the Biolog 'MicroLog' database CD ROM.
2. Put the database CD ROM into the CD ROM drive.
3. Click **Start**.
4. Select **Run**. Click on Browse. Click on the CD ROM drive.
5. The field should read **D:\SetUp(**database**).exe**. If drive D is not your CD ROM drive, then type in the correct drive letter.

6. Click **OK**.

7. Follow the instructions on the pop-up dialogs. Make note of the drive and directory path into which the database is installed.

8. To install the database into the OmniLog directory (**..Biolog\OLID_XX_XX)**, click **Finish**. If you chose a different directory for the OL software, then type in the name of that same directory, before clicking **Finish.**

3. Launching the OmniLog ID Program

In this section:
- **➔Initializing the System**
- **➔Printer Status**
- **➔Setting the Temperature**
- **➔Shutting the System Down**

The OmniLog ID System is preloaded with the software package. A Biolog service technician will help you set the system. After that, you will keep the computer and incubator/reader on at all times. The installation disks that come with your system are meant for back-up only in the event of a system crash.

Note: OmniLog ID software works only on the computer supplied with your OmniLog ID System. Do not try to install the software on another computer.

System requirements and recommendations:

1. *Biolog recommends the use of MicroSoft XP professional, service pack 2 operating system as it has increased stability compared to previous MicroSoft operating systems versions.*
2. *Power settings: All power saving features must be turned off for operation of the system.*
3. *The MicroSoft operating system must be reset (re-booted) 2 to 4 times per month. The OmniLog incubator/reader does not need to be shut down. This is to prevent possible system shutdown due to operating system stability factors.*
4. *Users required to be admin level on Windows operating system.*

If you ordered specific databases at the time of purchase, those will have been factory-installed. The databases containing species information come on separate computer disks and are also intended for back-up only in the event of a system crash.

Initializing the System

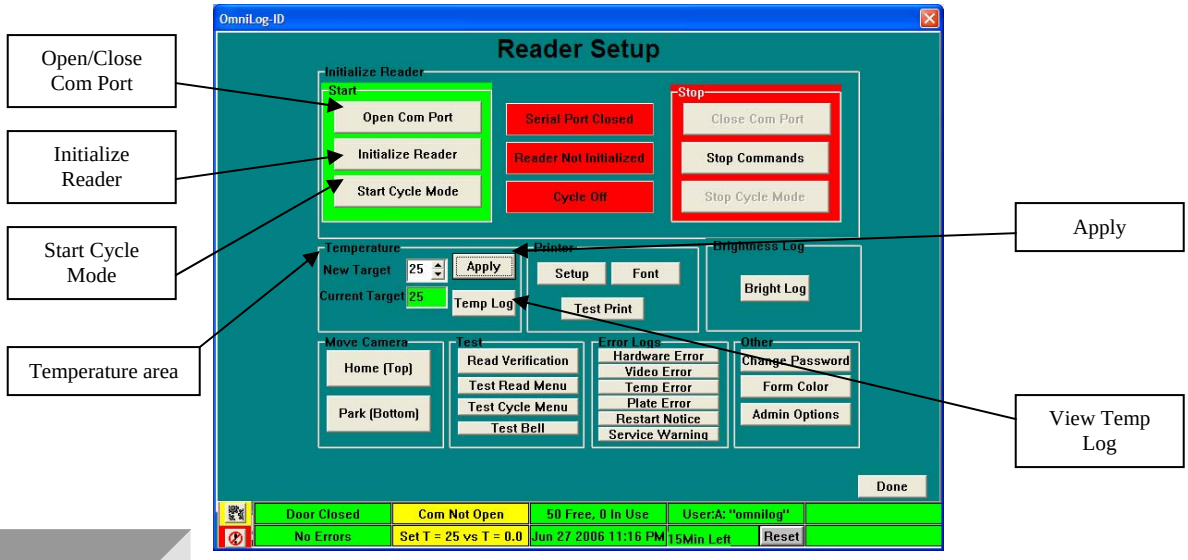
In the normal course of events, the system will have been initialized during set up for continual operation. However, stopping the system maybe necessary for preventive maintenance of the operating system (re-boot) or if you must move the OmniLog ID. Follow the instructions below to re-initialize the system.

1. Double-click the **OL_ID.exe** icon on your Desktop
2. The OmniLog software will initialize.
3. Click the **Log-In** button (upper right corner).
4. Enter **Username** and **Password.**

5. Press **Enter**.

WELCOME WINDOW

6. At the **Welcome** window, click the **Reader Setup** bar. The **Reader Setup** window will appear.



READER SETUP WINDOW

The Reader Setup window displays the set temperature and provides access to the temperature log of the OmniLog Incubator/Reader.

7. In the **Initialize Reader** area of the window, click the **Open Com Port** bar. The bar to the right will turn green and read **Serial Port Open** (this indicates that computer access has been enabled).

8. Click the **Initialize Reader** bar. The bar to the right will turn green and read **Reader Initialized** (this indicates that the computer and the incubator/reader are communicating).

9. The footer bar will say “Cycle Off”. If any error messages appear, see Section 13.

10. All the buttons in the **Test** area of the **Reader Setup** window will be enabled. See Chapter 13 for instructions on using these functions.

11. Click the **Start Cycle Mode** bar. The bar to the right will turn green and read **Cycle On** (this indicates that an OmniLog read cycle is ready).

12. The footer bar will say “Reader OK, Idle”.

Printer Status

See Section 13 for a full description of Reader Setup functions.

Printer and software status is displayed in the **Printer** area of the **Reader Setup** window.

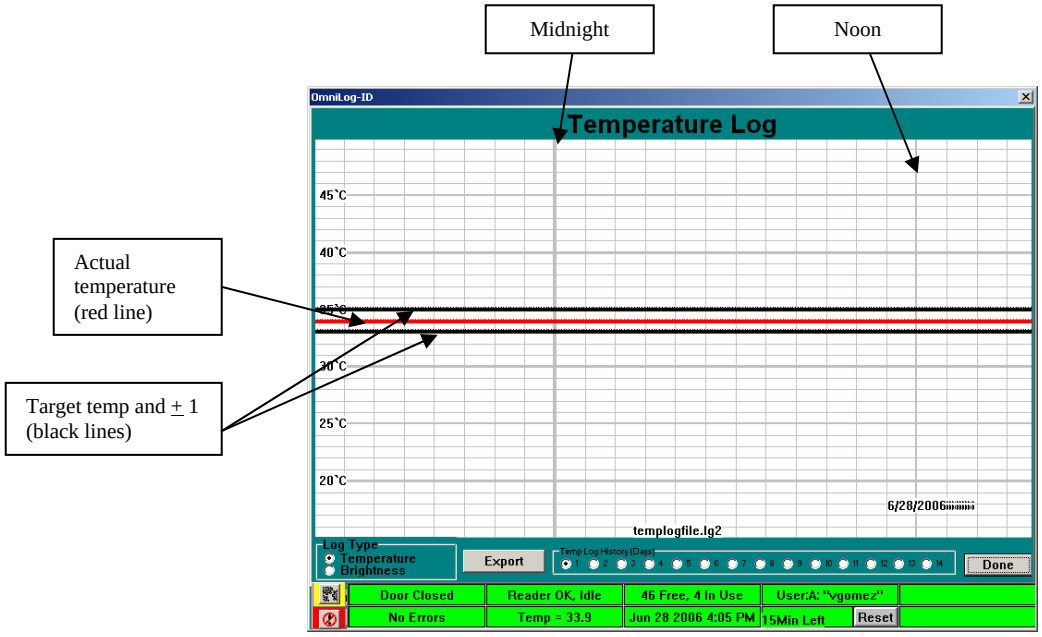
1. Click Test Print to verify printer operation. This will print three test pages.

Setting the Temperature

In the **Temperature** area of the **Reader Setup** window, use the **New Target** arrows to select the target temperature.

1. Click **Apply**. The **New Target** temperature will show as the **Current Target** temperature.

2. Click **Temp Log** to access a graphical log of 1-14 days of actual temperature readings for the incubator/reader. The **Temperature Log** window appears, displaying black horizontal lines that represent the target temperature range (1° less and 1° more than set value). The red line represents the actual temperature record. Each vertical line represents one hour. The medium thickness line represents noon and the thick line represents midnight.



TEMPERATURE LOG WINDOW

3. Click **Done**. The software will return to the **Reader Setup** window.

4. Click **Done**. The software will return to the **Welcome** window.

Shutting the System Down

Caution!

To perform an emergency stop of the OmniLog while it is moving Click on the emergency Stop Commands button on the Status footer bar.

As long as there are no MicroPlates in the reader with pending reads, you can exit the software by using the Exit menu or the "X" close button in the upper right of the screen. However, it's better to return to the **Reader Setup** window and shut down contact with the reader before you exit.

1. Click Stop Cycle Mode.

2. Click **Stop Commands**. This halts new communication between the software and the incubator/reader, but commands already in progress will continue.

3. To restore software contact with the incubator/reader, click **Initialize Reader**.

Note: Closing the Com (serial) port will shut down all hardware contact with the incubator/ reader.

4. Program Administration

In this section:

➔What is Restricted Access Mode?
➔First Log-In and Setting Up an Administrator
➔Administrator Functions
➔ Options Tab Functions
➔ Creating a User List
➔Interpreting the Log-In Log
➔Administration Suggestions

The OmniLog software can be run in either Restricted Access or Unrestricted Access mode.

- Restricted Access is the recommended mode.
- Data file integrity of modified files cannot be guaranteed with Unrestricted Access mode.

What is Restricted Access Mode?

Restricted Access Mode requires that only users with Administrator privileges have the ability to oversee and control access to the program.

The Administrator will:

- Assign User names and passwords for those who will use the system.
- Assign access privileges to each user.
- Oversee the security of the system

Restricted Access Mode requires all users to log in with a User ID and password when entering the program or changing users. The program maintains files of the **User List**, **Log-In Log and Log-In Log Archive** to keep track of registered users, access privileges, and log in/out activity in the system.

All of these files are encrypted. The Log-In Log Archive files can be placed by the Administrator in the computer/network location of their choosing. This allows the Administrator to place the files in a location that has secured access.

Why Restricted Access Mode?

Restricted Access Mode ensures that data integrity and security controls are implemented in accordance with the guidelines of 21 CFR Part 11. It assists in compliance with federal Current Good Manufacturing Practices (cGMP) by ensuring the integrity of program use and electronic files.

Security Features:

- User List and Log-in Log
- Notification of failed log in attempts
- User password change
- User privileges
- Session time-out
- Password expiration

- Log-in archive

Electronic record integrity:

- Limiting access
- Original record integrity
- Documentation of changes (by whom and when)
- Audit trails

What if I don't work in a 21 CFR compliant environment?

No problem! It is easy for the program Administrator to assign full access privileges to anyone in your organization who will be using the program. This will give everyone the ability to use all of the system's features, with the exception of the ability to access the Administration Options button.

Another option is simply to use the Administrator ID and password for all users, thereby giving everyone equal access.

Note: Original data files are automatically frozen when the data is generated. Freezing files is performed manually only with "copies" of Original data files.

First Log-In and Setting up an Administrator

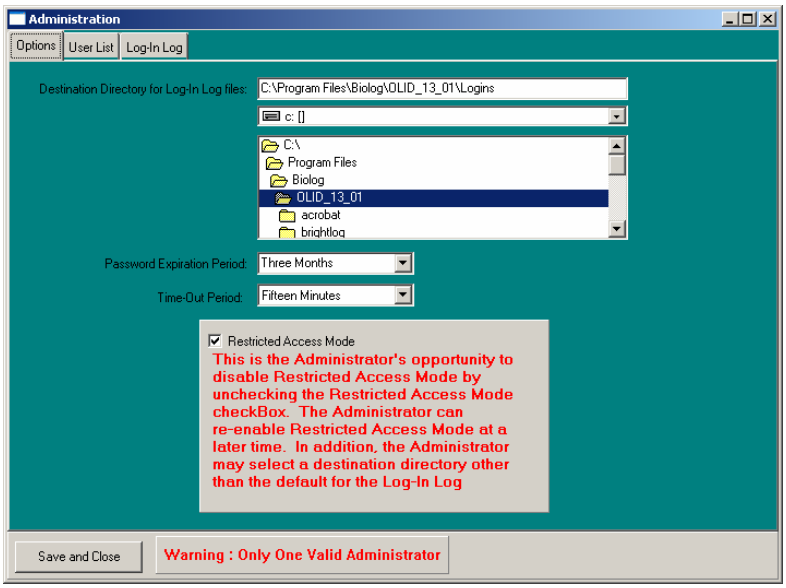
Please refer to *Section 2: Installation and Registration* for full instructions on how to set up an Administrator and Log In to the program for the first time. Ideally, this will be done soon after the program is installed.

Administrator Functions

When a program administrator is logged into the program, the **Administration** selection bar on the **Welcome** screen will be active. When other users are logged in, the **Administration** functions cannot be accessed.

Options Tab Functions

Once you have selected the Administration Options buttons, the **Administration Window** will open. By default, it will appear with the **Options Tab** selected. Make your selections from the available options and then click the **Save and Close** button.


Administration
Options
User List
Log-In Log
Destination Directory for Log-In Log files:
C:\Program Files\Biolog\OLID_13_01\Logins
c: []
C:\
Program Files
Biolog
OLID_13_01
acrobat
brightlog
Password Expiration Period:
Three Months
Time-Out Period:
Fifteen Minutes
Restricted Access Mode
This is the Administrator's opportunity to disable Restricted Access Mode by unchecking the Restricted Access Mode checkBox. The Administrator can re-enable Restricted Access Mode at a later time. In addition, the Administrator may select a destination directory other than the default for the Log-In Log
Save and Close
Warning : Only One Valid Administrator

Important!

- *If you test Password Expiration Period or Time Out Period features using system clock changes, the program must be closed when system clock changes are made.*

- *If not the Administration screen may appear with each Administrator Log-in until 100 Log-In/Log-Outs occur.*

- **Restricted Access Mode**
  Default is Restricted Access Mode (check in the box). Click on the checkbox to change the mode.
- **Destination Directory for LogIn-Log files**
  Shows the default directory where Log-In Logs Archive files are saved. Select the desired directory to place in the computer/network location of your choosing. You should select a secure location (for example, in a secure server or a password protected file folder).
- **Password Expiration Period**
  Use the pull down menu to select either **Three Months** or **One Minute**. The default is three months. This requires all users to select new passwords after 3 months. Select one minute to expedite validation testing only.
- **Time-Out Period**
  Use the pull down menu to select either **Fifteen Minutes** or **10 seconds**. The default is fifteen minutes. Select **10 seconds** to expedite validation testing only.

Creating a User List

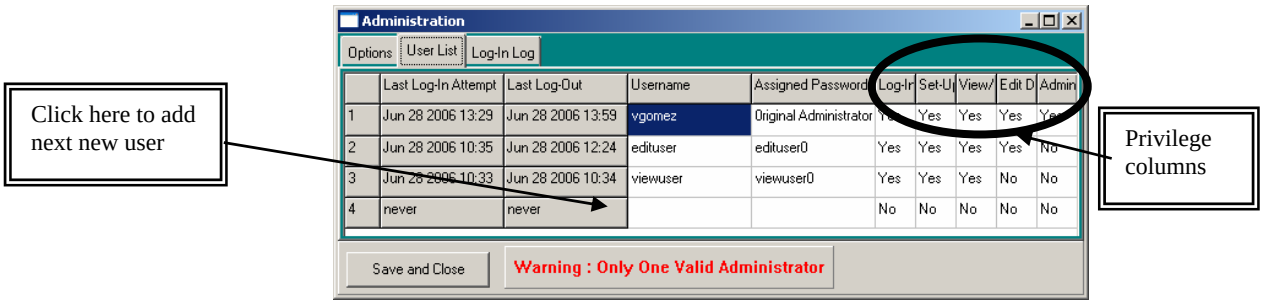
Adding new users and Assigning Privileges

On the **Welcome** window, click the **Administration** selection bar, and enter the **Administrator** username password. The **Log-In Log** will appear, showing the history of program use.

Note: Once the administrator adds a new user name to the user list, that name can never be deleted or changed.

1. Click the **User List** tab. A numbered list will appear, showing all users registered to that point, starting with the program administrator (in row 1).

2. To add a new user, click in the next blank (white) field in the **User Name** column. Enter the new user name.


Click here to add next new user
Administration
Options
User List
Log-In Log
Last Log-In Attempt
Last Log-Out
Username
Assigned Password
Log-In
Set-U
View/
Edit D
Admin
1 Jun 28 2006 13:29 Jun 28 2006 13:59 vgomez Original Administrator Yes Yes Yes Yes
2 Jun 28 2006 10:35 Jun 28 2006 12:24 edituser edituser0 Yes Yes Yes Yes No
3 Jun 28 2006 10:33 Jun 28 2006 10:34 viewuser viewuser0 Yes Yes Yes No No
4 never never No No No No No
Save and Close
Warning : Only One Valid Administrator
Privilege columns

USER LIST

3. Click in the blank **assigned Password** field next to that new user name. Enter a password for that new user.

4. Click in each **Privilege** box to the right, toggling between **Yes** and **No** to assign or deny specific access levels to that user.

5. Click the **Save and Close** button when you are finished.
6. Give the User Name and Password to the person you have registered, and refer them to *Logging In and Out (*starting on Pg. 5) if they need help using the program. Remember that the password you have chosen is only temporary; the user will be prompted to enter a new password the first time they Log In to the system.

Remember:

- *A user name must be at least 1 character in length.*
- *The password must be at least 6 characters in length, contain at least one number, and is case sensitive.*

Lost or Revoked Password

Occasionally, a user might simply forget or misplace their password. The user may have attempted entry 5 times with the incorrect password. If the user is NOT the only Administrator, this situation is easily remedied. Any Program Administrator can easily go to the **User List** under **Administrator Options** and assign the person a new password. Make sure to re-assign the user's privileges as well, or the new password will not work.

Log-In Privileges

Privilege	What It Allows In OmniLog ID
Log-In	User will be able to log onto the OmniLog ID software. This privilege is in tandem with all other privileges. It should be revoked when a user no longer Uses the system.
Set-Up	User will be able to perform general ID functions (Reader Setup, worksheet, Load, Unload), and change screen background to white.
View/Print	User will be able to view or print data from Read Menu and view error logs.
Edit	User will be able to mark Plates as done, Restore plate, clear all runs in progress, Snooze Function, and change temp or quit program with pending reads, clear error logs.
Admin	User will have complete access to all aspects of the software, including all Administration functions.

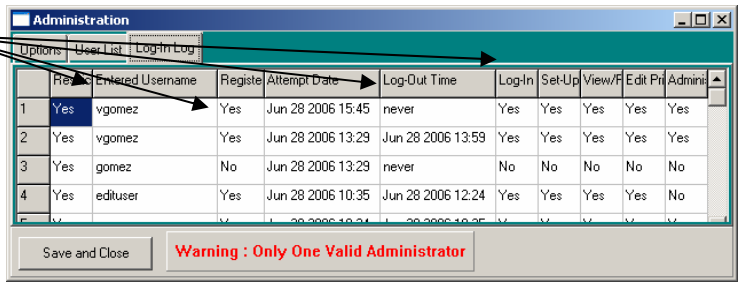
Interpreting the Log-In Log

Only the program administrator has access to the Log-In Log. This feature of the software keeps meticulous track of program use in descending order of date (with the most recent date and log-in first). This log is non-editable.

The Log-In Log records the past 100 log-in attempts. For each log-in attempt, the Log-In Log records the username, date and time logged-in, whether the username is registered, and the date and time the person logged-out. The Log also records which privileges registered users have, as well as whether the program is in Unrestricted Access Mode. This creates an audit trail (in both Restricted and Unrestricted Access modes). As log-in records in excess of 100 drop from the list, they are saved to a "Read-Only" file (Logins/LoginLogXXXXX.csv[1]). When this saved file contains 100 records, subsequent records will be saved to a new file with a different date stamp.

[1] XXXXX is a five-digit date stamp

Drag column lines here to widen or narrow columns


Administration
Options
User List
Log-In Log
Entered Username
Registe
Attempt Date
Log-Out Time
Log-In
Set-Up
View/P
Edit Pri
Admini
1 Yes vgomez Yes Jun 28 2006 15:45 never Yes Yes Yes Yes Yes
2 Yes vgomez Yes Jun 28 2006 13:29 Jun 28 2006 13:59 Yes Yes Yes Yes Yes
3 Yes gomez No Jun 28 2006 13:29 never No No No No No
4 Yes edituser Yes Jun 28 2006 10:35 Jun 28 2006 12:24 Yes Yes Yes Yes No
Save and Close
Warning : Only One Valid Administrator

SAMPLE LOG-IN LOG

Interpreting the Log-In Log

Column Name	*Information Given*
Restricted	If program was in Restricted Access mode when user logged-in, this entry will say **Yes**; if program was operating in Unrestricted Access mode, this entry will say **No.**
Entered Username	The user name of each person who logged in is listed here
Registered	If this person was an approved user, this entry will say **Yes**; if not, this entry will say **No**.
Attempt Date	This is the exact date and time the user logged in (or attempted to do so).
Log-Out Time	This is the exact date and time the user logged out. The entry here will read **Never** in the event of a failed log-in and when the program administrator is currently using the software.
User Privileges	
Log-In	**Yes** if access was given during that log-in period; **No** if not
Set-Up	**Yes** if access was given during that log-in period; **No** if not
View/Print	**Yes** if access was given during that log-in period; **No** if not
Edit	**Yes** if access was given during that log-in period; **No** if not
Admin	**Yes** if access was given during that log-in period; **No** if not

Form Color Change

To change the screen background from Teal to White, or White to Teal, click Form Color on the Reader Setup window.

Caution!

Admin Options button is only be used on the instruction of Field Service or Technical Service.
Reader serial number and Frame grabber revision letters are preset before shipment.

Administration Suggestions

Warning: It is important for the Administrator to use identical usernames in the OmniLog ID and other Biolog software programs to ensure consistency of records.

The Biolog OmniLog ID Data Collection, MicroStation ID and RetroSpect Trending and Tracking software programs include software control features that ensure data integrity by limiting access, ensuring that original data cannot be changed or deleted, and providing audit trails. These separate programs provide greater flexibility, but they also require that the administrator control and synchronize all programs. The administrator of the OmniLog program must integrate the software controls of each program into a regulatory compliant laboratory.

Usernames, Access Levels, and Passwords

The Biolog ID programs have separate User Lists. It is important to the administrator that these lists are consistent in order to create a reliable audit trail.

- When adding a user, be sure to include a profile for that user in both programs. Conversely, if removing a User's Access privileges, make the change in each program.
- Use identical user names in each program for a specific user.
- Instruct that when a user logs into a program for the first time that they Log-In and establish their own passwords in both programs. By doing this you will ensure that the User's passwords will expire at the same time and eliminate possible confusion.
- Instruct that if a User decides to change their password before the three-month expiration period, they make the change in each program.

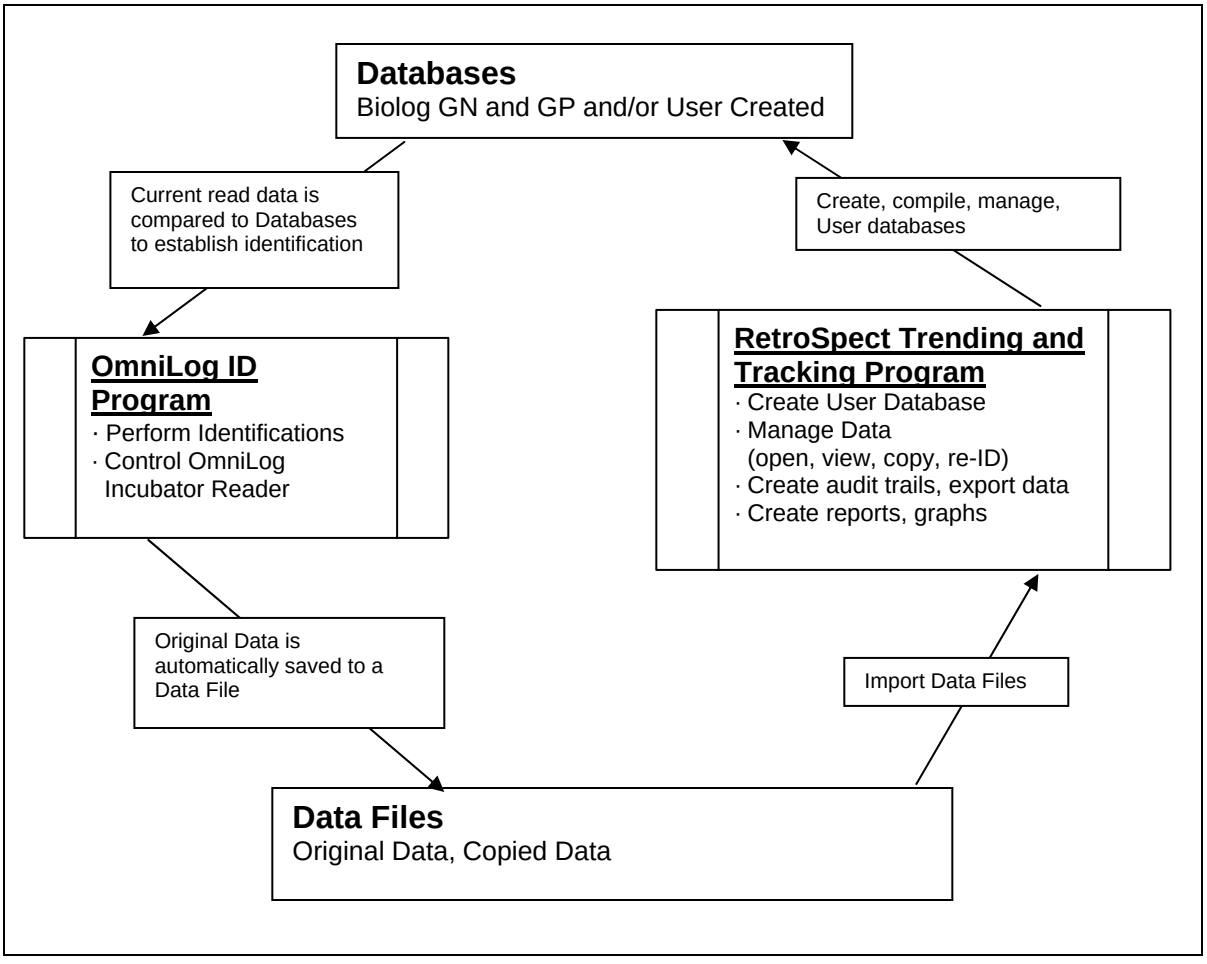
OmniLog Program Flexibility in Regulated Environments

There are a number of features in the OmniLog program software that enhance utility and allow it to be easily integrated into a regulatory compliant lab. It is important that the Administrator of the OmniLog software be aware of these features and their possible uses.

- **Log-In-Log Storage**- The Log-In Log will store the last 100 login attempts so that the administrator can easily see a history of program use. After the 100 record limit is reached, the program will move one record at a time to a file, and location of the administrators choosing. This

location should be secure and is specified on Options Page of the Administration screens.

- **Accessing and Managing Data**- Original Data (Including Species identification) is automatically saved and cannot be manipulated in any way, by any user. However Datafiles can be used to perform a number of useful functions such as the creation of User databases and the tracking of strains (for information on these functions and other data management features please see RetroSpect Trending and Tracking Software and MicroStation Software User Guides). The chart below gives an overview of the creation and use of data.


Databases
Biolog GN and GP and/or User Created
Current read data is compared to Databases to establish identification
Create, compile, manage, User databases
OmniLog ID Program
· Perform Identifications
· Control OmniLog Incubator Reader
RetroSpect Trending and Tracking Program
· Create User Database
· Manage Data (open, view, copy, re-ID)
· Create audit trails, export data
· Create reports, graphs
Original Data is automatically saved to a Data File
Import Data Files
Data Files
Original Data, Copied Data

OMNILOG DATA FLOWCHART

- **Program Locations**- The OmniLog ID program must be loaded onto the computer directly attached to the OmniLog incubator/reader.

5. Preparing Samples

In this section:

➔Isolating a Pure Culture
➔Gram Staining
➔Characterizing Aerobic Bacteria
➔Culturing Your Microbe
➔Preparing Inocula
➔Special Procedures for Spore-Forming Gram-Positive Rods
➔Inoculating MicroPlates
➔Incubating MicroPlates
➔Sample Preparation Process

As with any system, the precision and accuracy of OmniLog ID results require proper sample preparation. The most common identification problems result from improper lab technique and using non-recommended media. Using good sterile technique and the correct media greatly increase the likelihood of problem-free microbe identification.

If you're thinking of using non-recommended media – *don't*. The extensive OmniLog ID database was specifically developed using Biolog's carefully selected media. Using non-specified media causes changes in the physiology of microbes. Luxuriant growth and full metabolic activity are required for our system to work well.

The flowchart on page 1.3 provides an outline of the identification process. The table on page 5.13 gives a comprehensive overview of the sample preparation process, as does the flowchart in Appendix 1.

Each shipment of Biolog MicroPlates comes with an "Instructions for Use" booklet. Refer to these for more detailed instructions on how to setup your samples and troubleshooting tips.

Isolating a Pure Culture

BUG = Biolog Universal Growth

Culture your sample on Biolog's general-purpose culture medium. Nearly all the species in the OmniLog ID database will grow on Biolog Universal Growth media (BUG), generally with the addition of either 5% sheep blood or 0.25% maltose. If you have not purchased prepared media from Biolog, prepare media according to the package insert. See Section 11 for media preparation instructions.

Note*:* Identification of Filamentous Fungi, Anaerobes and Yeasts, require the use of the OmniLog Plus system. Refer to your MicroLog Manual for detailed procedures.

Refer to the "Instructions fo Use" for detailed directions about how to grow a healthy culture. In general:

Make certain you have a pure culture (a single organism)

Incubate at optimal temperature. Most bacteria should be grown at 35° C. Some genera are grown at 30° C (and a few gram positives at 26° C).

Do not allow cultures to grow for too long. Maximum growth is 24 hours for most bacteria. Some exceptionally slow-growing or fastidious bacteria may require 48 hours growth, or the use of multiple growth plates.

Preparing an inoculum directly from a mixed-growth plate will cause identification problems. Use the colony magnifier lamp to closely examine colonies.

Checking to see if your culture is pure

Colonies on the plate that seem to be isolated, may in fact be the result of mixed growth. This is especially true with *Staphylococcus* species. Careful visual examination is essential to ensuring that a culture is pure. If a colony shows any hint of pleomorphism, it is probably not a pure culture and requires additional re-streaking and isolation.

Carefully examine areas of confluent growth. If the lawn is not uniform in texture and color, this may indicate that the culture is not pure. Once again, re-streak for isolation.

Note: Unless your organism is a very slow grower, we don't recommend using lawn growth.

The opposite problem can also occur; sometimes a culture may be pure, but gives the appearance of heterogeneity. This is due to a rather common phenomenon whereby microorganisms produce more than one colony type. To be certain of its identity, purify and test each colony type individually.

Gram Staining

A Gram stain is essential in order to select the proper media and MicroPlates for testing Bacteria. Without a correctly identified Gram stain, you will not get good ID results. Once your initial culture has incubated sufficiently, perform a standard Gram stain. Determine the following:

- Is the microbe a bacterium or a yeast?
- Is the microbe gram positive or negative?
- Are the cells cocci or rods?
- Do the cells form spores?

Based on the source of the sample, the initial growth conditions, and the Gram stain, you should know the basic type of microbe you have. See Section 12 for specific Gram stain information. Refer to a basic microbiology textbook if you are unsure of these procedures.

Characterizing Aerobic Bacteria

Gram-negative and gram-positive aerobes each require further investigations to determine proper handling and identification.

Characterizing gram-negative microbes

If your microbe is gram negative, several additional tests will help determine whether your microbe is non-enteric **(GN-NENT)**, enteric **(GN-ENT)** or fastidious **(GN-FAS)** and determine the proper setup protocol. This has important implications in regards to choice of incubation temperature, inoculum density, and inoculating fluid.

Performing an oxidase test

Enteric: gram-negative bacteria belonging to Enterobacteriaceae group

Non-enteric: gram-negative bacteria not belonging to Enterobacteriaceae group

- Do an oxidase test on all gram-negative organisms. Refer to a basic microbiology textbook if you are unsure of this procedure.
- If the oxidase test is positive, organism grows well aerobically, you have a non-enteric (GN-NENT) microbe.
- If the oxidase test is negative and the bacterium forms large colonies, you most likely have an enteric (GN-ENT) microbe.
- Triple Sugar Iron (TSI) is an excellent method to confirm that your sample is GN-NENT or GN-ENT.

Setting up a TSI slant

- Prepare a TSI slant on oxidase-negative microbes. Refer to a basic microbiology textbook if you are unsure of this procedure.
- If the TSI slant shows a K/K (alkaline/alkaline) or K/A^{w} (alkaline/weak acid) reaction, your microbe is non-enteric (GN-NENT).
- If the TSI slant shows an A/A (acid/acid) or K/A (alkaline/acid) reaction, your microbe is enteric (GN-ENT). This is true with a few exceptions (such as *Pasteurella* A/A species or Acinetobacter A/late A), which can be weak oxidase positive.

Recognizing fastidious gram negatives

- Fastidious gram-negative bacteria are primarily isolated from the respiratory tracts of mammals.

- These bacteria grow poorly or not at all on BUG + B medium. They grow much better on chocolate agar at 35° C in an atmosphere of 6.5% CO_2.

Note: All microbes requiring a CO_2 atmosphere must be incubated in a secondary or offline incubator before placing in the incubator/reader for identification.

Characterizing gram-positive microbes

If your microbe is gram positive, pay special attention to the cell morphology in the Gram stain. Note the following:

- Determine whether the microbe is a coccus or a rod.
- If the microbe is a rod (GP-ROD), determine whether it is spore-forming bacillus (GPR-SB, consisting of *Bacillus* and species formerly called *Bacillus*). Spore-formers require special handling and testing. See pages 5.7- 5.10.
- It can be difficult to recognize *Bacillus* species from a Gram stain, but most may be recognized by colony morphology. They are often fast growers, forming colonies that have unusual characteristic textures (e.g., spreading, slimy, crusty, dry, embedded, or forming skin-like pellicles).

Performing a catalase test

It is advisable to perform a catalase test (3% hydrogen peroxide) on GP-COCCUS and GP-ROD isolates. The catalase reaction can help you verify or narrow down the species identification. If the organism is catalase-negative, this generally indicates a slow grower. Subculture onto agar to obtain a lawn of growth using a swab or loop. You may need more than one agar plate. Refer to a basic microbiology textbook if you are unsure of this procedure.

Culturing Your Microbe

Subculture onto the proper agar medium using a single, isolated colony. Most of the species in Biolog's database are relatively fast growers. However, if your microbe grows slowly, you may need to streak (subculture) more than one agar plate.

Incubate according to Instructions on package insert. For use GN2 and GP2 MicroPlates in general:

- Incubate most organisms for 24 hours. Very slow-growing species may require 48 hours.

- If using an offline incubator, don't over-incubate the culture. Excess incubation can cause microbes to enter a stationary phase, during which they lose viability and metabolic activity. (All culture plates will be grown in a secondary or offline incubator).

Table 5-1 and Appendix 1 will help you select the correct culture medium.

Media shorthand:

B = blood
M = maltose
T = thioglycolate

TABLE 5-1: SELECTING THE CORRECT CULTURE MEDIUM

Organism Type	Organism Abbreviations	Culture Media
Gram Negative Non-Enteric	GN-NENT	BUG + B
Gram Negative Enteric	GN-ENT	BUG + B
Gram Negative Fastidious	GN-FAS	Chocolate
Gram Positive Cocci	GP-COCCUS	BUG + B
Gram Positive Rods (non-spore forming)	GP-ROD	
Gram Positive Rods (spore forming bacillus)	GP-ROD SB	BUG + M + T

Preparing Inocula

Once your microbe is isolated and cultured, prepare a liquid inoculum. Refer to instructions enclosed with Biolog MicroPlates for detailed directions. In general:

STOP!
Is your suspension density accurate? Did you calibrate the turbidimeter using Biolog's Turbidity Standards?

- The inoculum MUST be within the range specified by the turbidity standards accompanying your database (± 2% T).
- The inoculum MUST be uniformly suspended. If an organism forms clumps, you will need to use special techniques to achieve a homogenous suspension. See Step 4 on p 5.9, the bracketed bullets, and Section 12 for additional information.

Table 5-2 will help you decide which suspension medium to use:

TABLE 5-2: SELECTING THE CORRECT INOCULATING FLUID, TURBIDITY STANDARDS, AND CELL DENSITY

Organism Type	Inoculating Fluid	Turbidity Standards	Inoculum Density
Gram Negative Non-Enteric	GN/GP-IF	GN-NENT	52% T
Gram Negative Enteric	GN/GP-IF + T	GN-ENT	61% T
Gram Negative Fastidious	GN/GP-IF + T	GP-COC & GP-ROD & GN-FAS	20% T
Gram Positive Cocci Gram Positive Rods (non-spore forming)	GN/GP-IF + T	GP-COC & GP-ROD & GN-FAS	20% T
Gram Positive Rods (spore forming bacillus)	GN/GP-IF	GP-ROD SB	28% T

Adding thioglycolate to inoculating fluid

Some microbes (see Table 5-2) require the addition of thioglycolate (T) to the inoculum. Thioglycolate acts as an anticapsulate agent; it decreases production of bacterial capsules so that strains give more consistent patterns. Biolog's product line includes droppers of thioglycolate. To add thioglycolate:

Don't forget to add thioglycolate when working with:

GN Enteric
GN Fastidious
GP Cocci & Rods

1. Hold reagent dropper upright and point tip away from you. Using a dissecting hemostat fully crush ampule close to its center one time only. Tap the bottom on benchtop a few times.

Caution: Do not manipulate dropper any further, as the plastic may puncture, causing injury.

2. Invert the dropper for convenient drop-by-drop dispensing of reagent.
3. Dispense precisely 3 drops of concentrated thioglycolate into your inoculating fluid. Do not use more than 3 drops per 18-20 ml. This gives you a 5mM final concentration.
4. Each dropper contains about 10-15 drops. You can continue to use an open dropper for the rest of the day, and then discard the remainder.

Adding sodium salicylate to inoculating fluid

If gram-positive (non-spore-forming) bacteria are false positive (positive A1 well) even after you've added thioglycolate to the inoculating fluid, try adding sodium salicylate:

1. Add thioglycolate as described above.
2. Add 1 ml of sterile 100 mM sodium salicylate to 18-20 ml of GN/GP-IF. This gives you a 5mm final concentration.
3. Proceed with sample preparation.

Preparing inocula

Remember, your microbes are alive. Treat them with care. Use fresh cultures.

Once you've added thioglycolate (if necessary), prepare the inocula:

1. Establish the appropriate turbidity range on your turbidimeter by adding and subtracting 2% T to the percent transmittance measured with the appropriate turbidity standard.

2. Lift cells from the agar by rolling the swab over the colonies, rather than sliding across them. Be sure not to pick up any agar.

3. Twirl the swab against the inside surface of the tube (above the fluid line) to gently suspend the colonies.

4. Dip the swab into the fluid and stir with a up-down motion to the bottom of the tube to create a uniform suspension. You can also use a sterile transfer pipet to mix without creating an aerosol. Recap the tube and invert if using our GN/GP-IF.

5. Adjust the inoculum density so it is within the specified turbidity range. You can change the density by adding more cells (to increase density) or more inoculating fluid (to lower density).

6. Examine your suspension and make certain that it is homogeneous and free of clumps. It is essential that the cell suspension does not contain clumps. If there are only a few clumps, allow them to settle to the bottom, pouring off the supernatant. *If the bacterial suspension is not homogenous, use the special procedures described in Step 4 on page 5.8-5.9 and in Section 12.*

Special Procedures for Spore-Forming Gram-Positive Rods

Bacillus species are known for being difficult. They start to sporulate within a matter of minutes of introduction to a growth-limiting medium. They also tend to form clumps, crusts, and pellicles (skin-like sheets) when they grow on an agar surface, making it difficult to prepare uniform cell suspensions.

Always use the following special swabbing and streaking technique with *Bacillus* species:

1. Isolate a pure culture. When the culture is pure, subculture on BUG + M + T (0.25% maltose swabbed with thioglycolate).

To add thioglycolate to the agar plate:

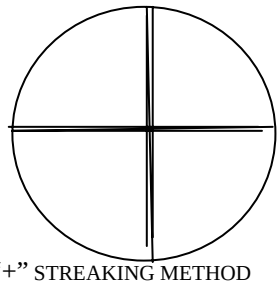
Before streaking the bacterium, add precisely 8 drops from a thioglycolate dropper into 3 ml of sterile water.

- Dip a sterile swab into the solution to moisten the cotton tip.
- Spread a thin film of liquid across the entire surface of the agar medium once.
- Allow time (approximately 5 minutes) for the Thioglycolate to dry on the agar. (Do not use wet plates, as the cultures will spread.) This will stimulate cells into vegetative growth phase and decrease cell clumping.

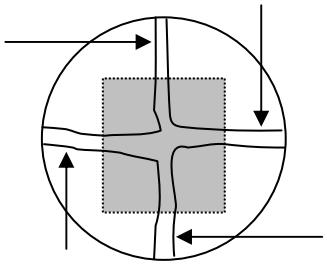
2. Using Biolog's sterile Streakerz™ sticks, touch a colony and make a plus sign (+) on the center of the agar media going across each of the two lines one or two times, with the following exceptions:

   - If the organism is a fast grower and spreads, make a very thin plus sign (+) once to avoid excess growth and sporulation.
   - If the organism is a very slow grower, multiple agar plates (2-3) may need to be inoculated.

The goal of this streaking technique (see the diagram below) is to restrain cell growth to two thin lines so that the cells along the edges have a good supply of food. This keeps the cells in an active state and decreases sporulation.



"+" STREAKING METHOD



CELL GROWTH AFTER INCUBATION

3. Incubate at 30° C for 16-24 hours; do not exceed 16 hours for fast-growing strains.
4. Use a wooden Biolog Streakerz™ stick to prepare cell suspensions. Scoop a small mass of cells onto the tip of the stick. Avoid the area enclosed by the dashed box. The cells located outside the gray area above are the most active cells.

- It is essential to only take colonies starting at the ends of the "Plus" sign to half way down the junction of the two lines constituting the "Plus" sign. In other words, never pick up the bacteria from the center or close to the center.

This technique is called the "Dry Tube Method" The method is recommended for all mucoid or dry colonies.

- Pick up colonies with a wood Streakerz (not a swab) Rub the colonies around the walls of an empty, sterile dry glass tube (once the glass becomes wet, clumps are difficult or impossible to disperse) until mucoid, dry colonies or any other sticky particles have been broken. Use circular and up and down motions to create a smooth, even, film along the inside surface of the tube.
- Add ~5 ml GN/GP IF to suspend the film. Mix the suspension with a sterile cotton swab using an up and down motion to ensure that all the cells have been suspended in a homogenous mixture.
- Add the remaining fluid and adjust turbidity to match the turbidity standard at 28%T ± 2% (OD 0.55).
- Cell suspensions must be free of mucus, clumps, or dry undissolved colonies.
- Prepare cell suspensions with a stick, as swabs are too soft and will not be able to break up clumps.

5. Let the suspension stand for approximately 5 minutes to ensure that no solid particles remain. If the suspension is not homogeneous, pour the supernatant into another sterile tube and proceed with the next step.
6. Check the turbidity of the supernatant. If it is too low, incubate the test tube containing the sediment fraction (unsuspended fraction) for 5 minutes at 35° C.
7. Remove the tube from the incubator and vortex lightly until all matter is dissolved. If necessary, add extra fluid from the previously separated fraction (supernatant) to re-suspend the culture. Repeat this process until you reach the appropriate transmittance required for MicroPlate inoculation.
8. Inoculate a GP2 MicroPlate.
9. Incubate at 30° C for 4-22 hours.

General hints for handling Bacillus

☑ Always grow *Bacillus* species on BUG + M + T for identification.

☑ Keep the incubation time as short as possible to reduce sporulation (i.e., incubate for 16 rather than 24 hours if it's a fast grower).

☑ If you have a strain that is difficult to disperse, be sure you have carefully prepared the inoculum using the dry tube procedure. Let the suspension stand for a 5 minutes to allow the clumps to settle to the bottom. Carefully transfer the supernatant into another dry sterile tube to check the transmittance. If necessary, add more organism using the Dry Tube Method.

☑ *Bacillus cereus* and *Bacillus thuringiensis* are considered indistinguishable by biochemical assays. These two species are listed in the Biolog database as *Bacillus cereus/thuringiensis*.

☑ You may need to use more than one BUG + M + T agar plate for slow-growing organisms.

Inoculating MicroPlates

Caution**!**
Pipet the inoculum into a MicroPlate within 20 minutes! Use sterile technique.

Inoculate the suspension into one of the following Biolog MicroPlates:

GN2 MicroPlate: For all gram-negative aerobic bacteria

GP2 MicroPlate: For all gram-positive aerobic bacteria

Pipet your inoculum into a Biolog MicroPlate within 20-30 minutes. Waiting any longer may cause inaccurate identification. When running a batch of MicroPlates, set them up (from preparing the inoculum to pipetting into the MicroPlate) so you will not exceed the 20 minute deadline.

Inoculating protocol

1. Label the MicroPlate with the organism name/number and plate type (e.g., GN, GP). Label the side of the MicroPlate itself, not the lid.
2. Using aseptic technique, pour the cell suspension into a multichannel pipette reservoir.
3. Firmly attach eight sterile tips to the pipetter. Refer to the pipetter manual for further instructions.

4. Fill the tips with the suspension. Check to see that all tips are filling equally and the tips are not leaking.
5. Prime the tips by dispensing once back into the reservoir. If you are using an electronic pipetter, it will prime itself.
6. Fill all MicroPlate wells with 150µL/well (for both Gram negatives and Gram positives). Take care not to splash from one well to another. Avoid contamination.
7. Avoid touching the bottom of the wells, which could transfer carbon sources.
8. If the fluid level in the tips gets low, refill and continue dispensing until all wells are full. The electronic pipetter will double beep, signaling you to purge and refill if necessary.
9. Cover the MicroPlate with its lid.

Incubating MicroPlates

Note: Identification of Filamentous Fungi, Anaerobes and Yeasts, require the use of the OmniLog Plus system. Refer to your MicroLog Manual for detailed procedures.

As soon as you dispense the suspension, incubate the MicroPlate using the appropriate temperature, atmosphere, and time conditions. Table 5-3 and the Appendices will help you select the correct conditions. Remember, the OmniLog can only be set to one temperature per cycle. MicroPlates requiring other incubation temperatures must be incubated offline.

TABLE 5-3: SELECTING CORRECT INCUBATING CONDITIONS

Organism Type	Temperature	Atmosphere	Incubation Time
Gram Negative Non-Enteric	30° C	Air	4-6 and 16-22 hours
Gram Negative Enteric	35° C	Air	4-6 and 16-22 hours
Gram Negative Fastidious	35° C	6.5% CO_2	4-6 and 16-22 hours Incubate in secondary incubator
Gram Positive Cocci Gram Positive Rods (non-spore forming)	35° C or 30° C or 26° C (if required)	Air or 6.5% CO_2 (if required)	4-6 and 16-22 hours Incubate in secondary incubator if CO_2 required
Gram Positive Rods (spore forming bacillus)	30° C or 55° C (if required)	Air	4-6 and 16-22 hours

Sample Preparation Process

Initial culture medium	BUG + B*(whatever media you usually isolate from can be used here)				
	Gram stain and observe cell morphology				
Gram stain results	**↓ Gram Negatives ↓**			**↓ Gram Positives ↓**	
Characterization test	Oxidase positive or requires 30° C	Oxidase negative and TSI=A/A or K/A	Requires CO_2 or chocolate agar or < 1 mm colonies on BUG + B or no positive reactions when set up as ENT or NENT.		
Characterization test	Oxidase negative and TSI=K/K or K/A^w				
Strain type	**GN-NENT**	**GN-ENT**	**GN-FAS**	**GP-COCCUS or GP-ROD**	**GP-ROD SB** (spore-forming bacillus)
Culture medium	BUG + B	BUG +B	Chocolate	BUG + B	BUG + M + **T** "+"streaking
Temperature	Typically 30º C	Typically 35º C	Typically 35º C	Typically 35º C	Typically 30º C
Atmosphere	Air	Air	6.5% CO_2	Air or 6.5% CO_2 (if required)	Air
Inoculating fluid	GN/GP-IF (if A1 well is pos, add thioglycolate)	GN/GP-IF + **T**	GN/GP-IF + **T**	GN/GP-IF + **T** (if A1 well is pos, add salicylate)	GN/GP-IF
Inoculum turbidity/ Turbidity standard	52% T GN-NENT	61% T GN-ENT	20% T GP-COC & GP-ROD & GN-FAS	20% T GP-COC & GP-ROD & GN-FAS	28% T GP-ROD SB
MicroPlate type/µl per well	GN2 150	GN2 150	GN2 150	GP2 150	GP2 150
Incubation time (hours)	4-6, 16-22	4-6, 16-22	4-6, 16-22	4-6, 16-22	4-6, 16-22

**Note: Agricultural bacteria may be grown on BUG without blood.*

6. Loading and Reading MicroPlates

In this section:
➔Checking Load and Batch Status
➔ Setting Up a Worksheet
➔ Read Modes
➔ Choosing a Database to Search
➔Loading MicroPlates into the Incubator/ Reader

Once your MicroPlates are properly inoculated (see Section 5), the next step is to enter information into OmniLog ID. This information relates to organizing plate data on worksheets, managing files, and printing results. Then you can load MicroPlates into the incubator/reader.

OmniLog ID is an automated system that relies on proper record-keeping at the start of each batch. Be sure to proceed through these data-entry tasks with care.

The incubator/reader can hold up to 50 batches of MicroPlates (with two MicroPlates per tray and one worksheet assigned to each batch).

**Note: Filling out a manual worksheet in preparation of the setup helps with workflow. See Appendix 2 for a sample worksheet.*

Checking Load and Batch Status

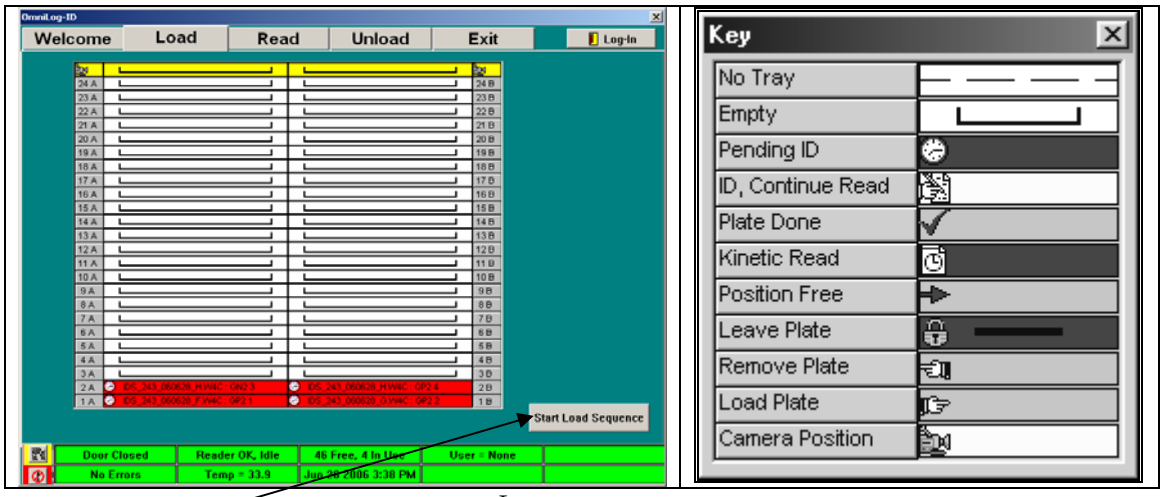
In the normal course of operation, the Read window will be displayed when you begin the process of loading MicroPlates. The Load window shows a picture of the tray stack and indicates the current status of all MicroPlates in the incubator/reader. The Read window gives details about each MicroPlate currently in the incubator/reader.

Table 6-1 explains the entries you will see on this screen.

TABLE 6-1 LOAD WINDOW ENTRIES

Key	Explanation
Numbers along left and right edges	Correlate to tray numbers, starting with number 1 at the bottom through number 25 at the top
A and B designations along left and right edges	A = left column of MicroPlates B = right column of MicroPlates
White slots with ----------	Slot empty of both MicroPlates and tray
White slots with [_____]	Slot contains tray, but not MicroPlate
Green background with red checkmark icon	Slots that contain MicroPlates that have been read and are ready to be removed
Yellow background with hand writing icon	Slots containing MicroPlates that have been read but are not ready to be removed. Data still saving.
Red background with clock icon	Slots containing plates that haven not been read yet

1. Click **Load** on the top menu bar.
2. Click on any row for an explanatory key.



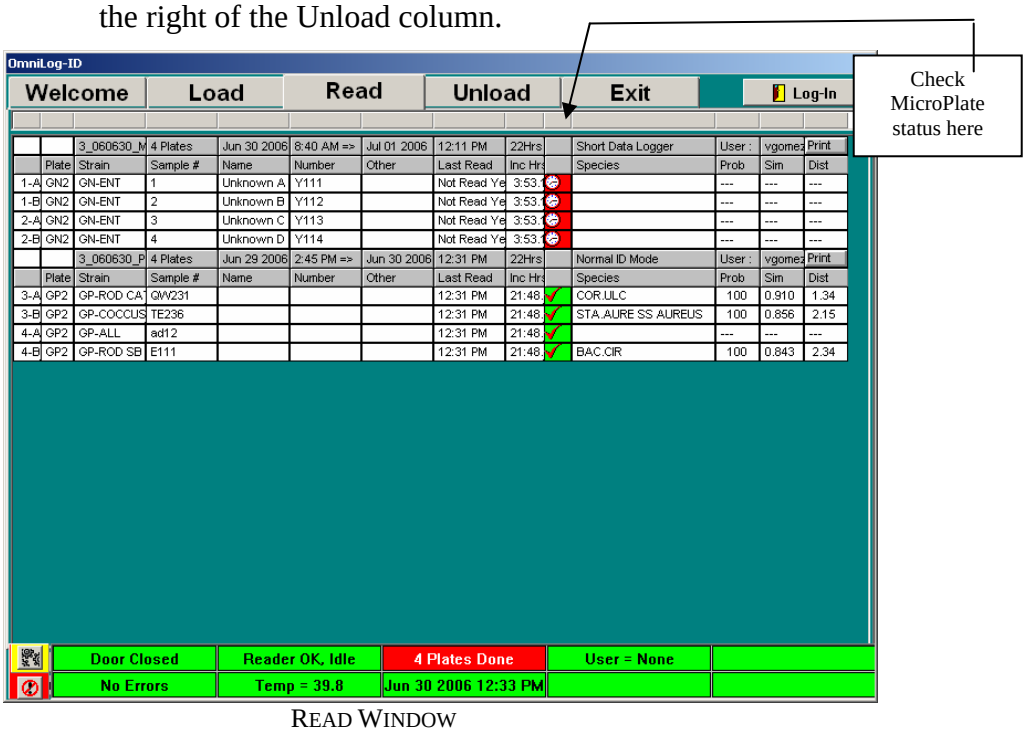
LOAD WINDOW AND LOAD KEY

Start Load Sequence

3. Check the **Load** window to ascertain which slots are open for new MicroPlates. The Footer bar will state how many slots are available.

4. Click **Read** on the top menu bar. The Read window will appear, showing details for each MicroPlate currently in the incubator/reader. Check batch status by tracking the icons to the right of the Unload column.

> **Caution!**
> *Be sure to load MicroPlates into the incubator/reader within 20 minutes after inoculating them. Allowing MicroPlates to sit around can cause you to miss readings.*



READ WINDOW

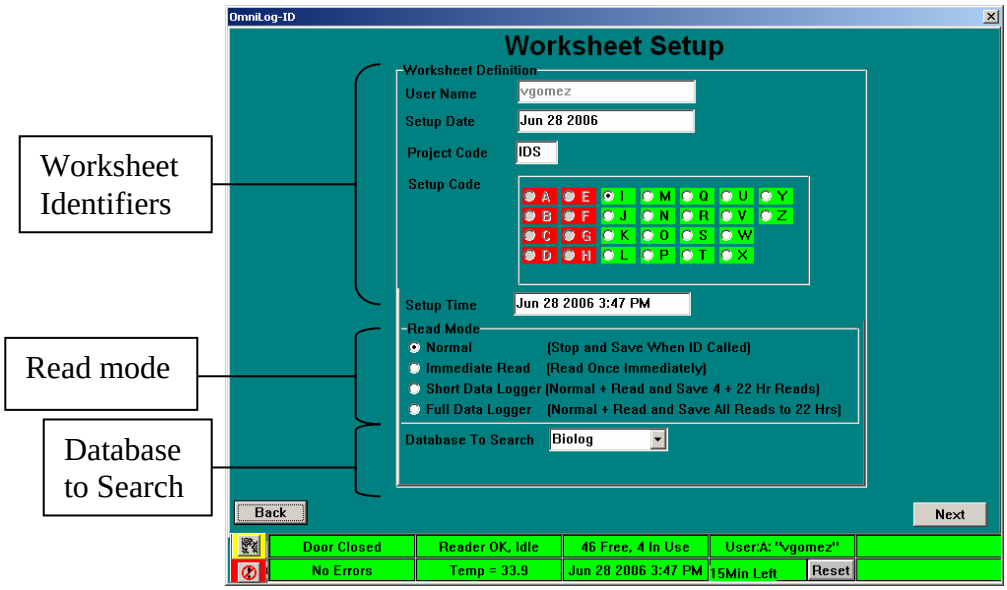
Table 6-2 explains the columns on this screen.

TABLE 6-2: READ WINDOW DATA

Column	Explanation
Position Number	Shows batch slots as they are in the incubator/reader
Plate Type	Shows Plate type entered
Strain type	Shows strain type entered
Sample Number	Shows sample number entered
Strain Name	Shows strain name entered
Strain Number	Shows strain number entered
Other	Shows the other text entered
Last Read	Shows the elapsed since data was taken
Incubation Hours	Shows how long the MicroPlate has been incubating
Plate Status	Shows those slots that are done and continuing reading

Setting Up a Worksheet

Once you've established current load status, you must set up a worksheet for the new batch. Remember, each batch gets a separate worksheet.



Worksheet setup window

1. Click the **Start Load Sequence** bar at the lower right side of the **Load** window.

2. The **Worksheet Setup** window appears. This window allows you to define a worksheet for the batch of MicroPlates you are about to load.

3. Today's date automatically appears in the **Setup Date** field of the **Worksheet Definition** box. You may change it to any date you wish.

4. The worksheet and subsequent data files are named automatically, based on the setup date, a **Setup Code** letter, and a 3 character **Project Code**.

    a. The purpose of the Project code is to give the user the opportunity of organizing data under a specific project name or number.

    b. If the user does not specify a Project code, the default code of **IDS** will automatically be selected.

    c. The purpose of the setup code letter is to differentiate between different worksheets set up on the same date.

5. The worksheet setup menu will automatically enter the setup date as the current date and assign the next available setup code.

    a. You can manually change both the setup date and code by clicking on the **Setup Date** field and **Setup Codes** radio buttons.

    b. The codes already used for the given date will be disabled.

Remember: Any selections you make on the Worksheet Setup window applies to ALL MicroPlates in that batch.

6. The default value in the **Setup Time** field is the current system time (this refers to time of day the MicroPlates in the worksheet batch were set up).

    a. You can change this value by clicking on the **Setup Time** field.

    b. While the plates are in the incubator/reader, the incubation time for the plates will be calculated by the current system time minus the setup time you entered for the MicroPlates.

    c. All MicroPlates in a worksheet batch will have the same setup time.

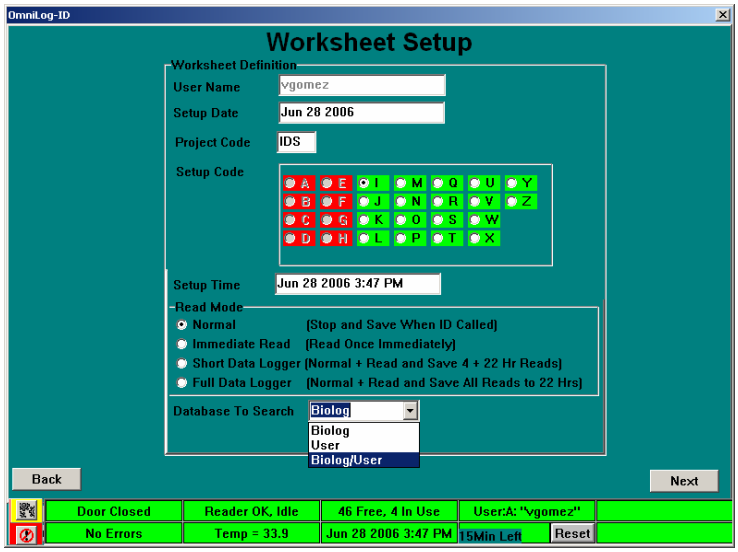
Read Modes

TABLE 6-3: PROGRAM READ MODES

Mode	What It Does
Normal	MicroPlates are scheduled to read at a maximum of 4 times during the 4 to 6 hour incubation time window, with readings occurring every half-clock hour. They are then scheduled to read at a maximum of 12 times during the 16 to 22 hour incubation time window. The scheduled readings stop when an ID is made, a file is saved to disk and the ID Report is printed. If no ID is found, the last read (22 hour) is saved and the ID Report is printed. When an identification is made, the MicroPlate is marked on the computer screen as finished. The MicroPlate can be removed freeing up the position in the incubator/reader.
Immediate	This mode is for Identification MicroPlates that are incubated off-line. All the MicroPlates in the worksheet will be read once immediately after loading is finished. The system will not wait for the next half clock hour. This single reading will be automatically saved to the computer disk and the ID Report is printed out. The MicroPlates are marked as finished and can be removed. When using this mode, be sure to use the correct setup time (there is an option in the setup time dialog that will automatically choose the previous day's date and time).
Short Data Logger	This mode is useful for building a user database. MicroPlates are read 4 times during the 4 to 6 hour incubation time window, with readings occurring every half-clock hour. The first (1) and fourth (4) reading are saved as separate files. Then the MicroPlates are read 12 times during the 16 to 22 hour incubation time window. The first (1) and twelfth (12) reading are saved as separate files. If an ID is called, the reading is saved to file and the ID Report is printed. The system keeps the MicroPlate as a pending read, continuing to save all four (4) files, until the last reading at 22 hours is taken.
Full Data Logger	This mode is useful for building a full progressive user database. MicroPlates are read 4 times during the 4 to 6 hour incubation time window, with readings occurring every half-clock hour. Four (4) reading are saved as separate files. Then the MicroPlates are read 12 times during the 16 to 22 hour incubation time window. Twelve (12) reading are saved as separate files. If an ID is called, the reading is saved to file and the ID Report is printed. The system keeps the MicroPlate as a pending read, continuing to save all sixteen (16) files, until the last reading at 22 hours is taken.

Choosing a Database to Search

OmniLog software allows you to select which database you want to search. If you have created User (custom) databases you can search the OmniLog databases, the User database or both. For information on creating a User database, see RetroSpect Trending and Tracking Software.



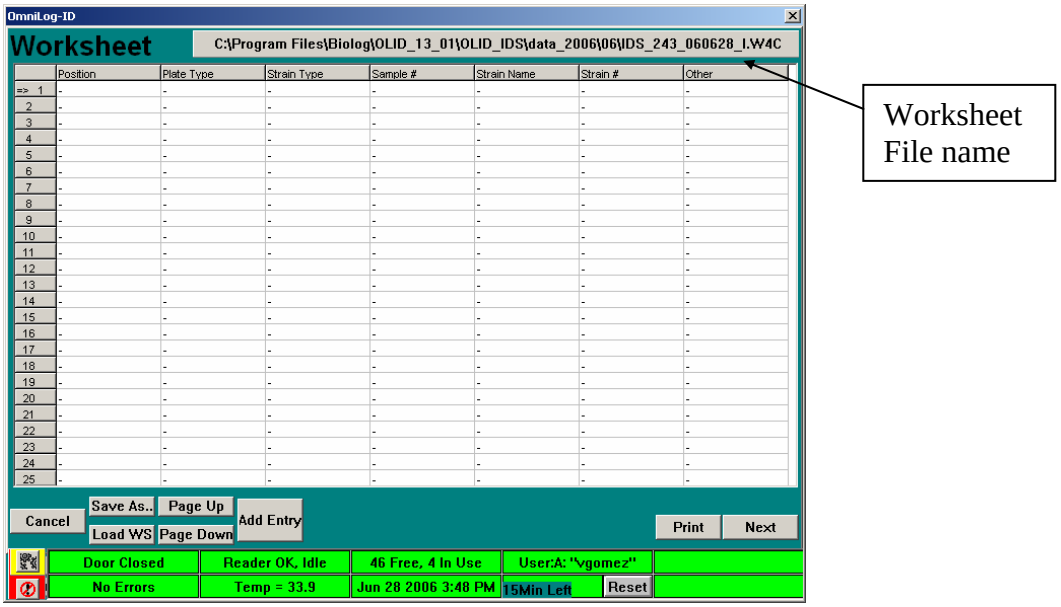
DATABASE WINDOW (TO SELECT DATABASE TO SEARCH)

1. Use the **Database to Search** drop-down list to select the database you want. If you select a User or OmniLog/User database, the Database **File** dialog box appears.
2. Select the desired database by choosing the file name.
3. Click **OK**.

Note: When you're conducting a OmniLog/User database search, a "U" will appear on the Species ID ranked list on the Data window to denote species in the User database. Also, you will see a ML/user designation in the upper left corner of the organism choices.

Verify that all information on the **Worksheet Setup** screen is correct. Once the **Next** button is clicked, the worksheet will be locked.

4. Click **Next** to continue entering the worksheet (the Worksheet window will appear) or click **Back** to return to the **Load** window.



WORKSHEET WINDOW

Table 6-4 Explains The Actions of Various Buttons on This Screen.

TABLE 6-4. WORKSHEET WINDOW BUTTONS

Button	Function
Abort	Ends worksheet process
Page Up	Allows you to view lower numbered entries
Page Down	Allows you to view higher number entries
Add Entry	Allows you to enter data for each MicroPlate
Print	Allows you to print current worksheet
Next	Locks down the current worksheet entered
Save As	To save worksheet under designated file name
Load WS	To Load Pre-designated worksheet

5. Click **Add Entry**. The **Plate Information** window appears.

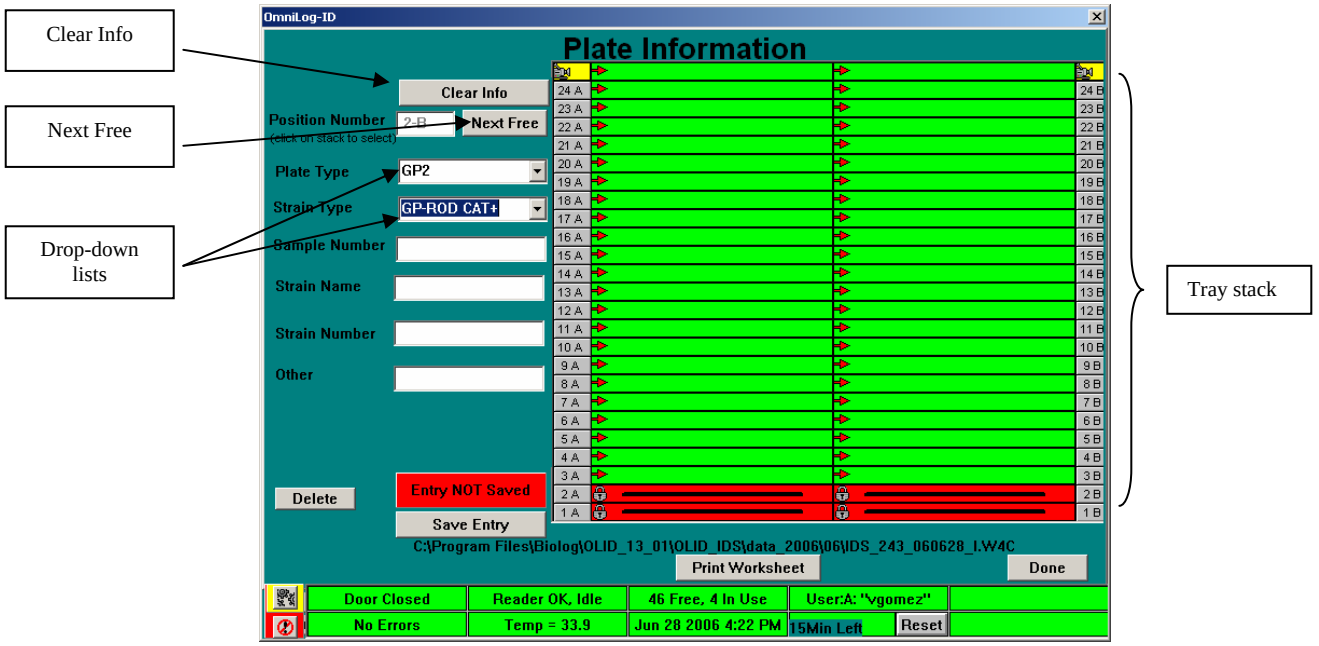


PLATE INFORMATION WINDOW

You can edit a worksheet while you are working on it by clicking on the position number of the entry you wish to edit.

Click **Clear Info** if you wish to clear all entries entered previously.

Select a position number by clicking anywhere on the tray stack or click **Next Free** for the next available position.

Select the correct **Plate Type** and **Strain Type** using the drop-down lists.

Type correct entries into the **Sample Number**, **Strain Name**, and **Other fields**.

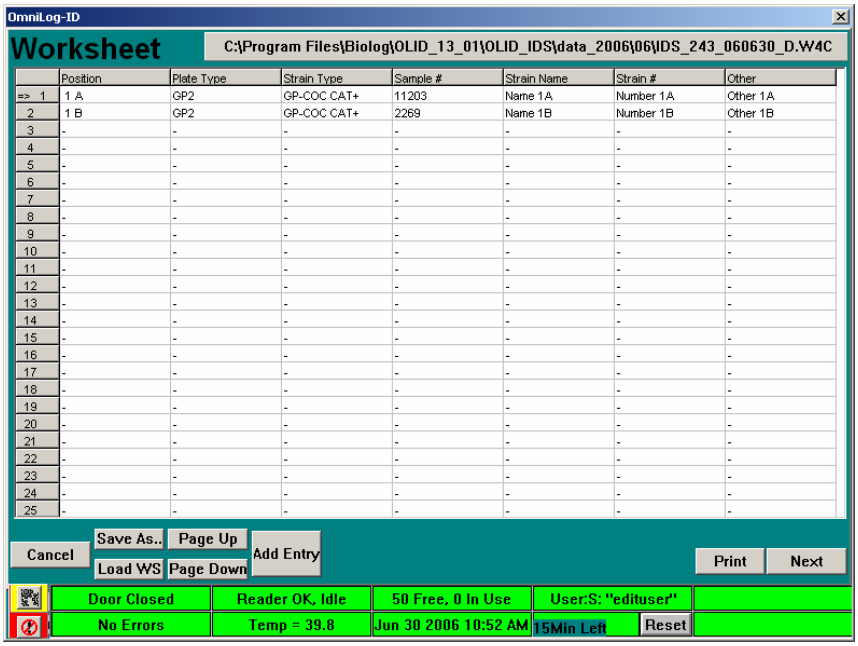
Click one of the following, depending on what you want to do:

- Click **Clear Info** to clear the values you just typed in
- Click **Next Free** to assign the next free tray position
- Click **Delete** to delete the position entry
- Click **Save Entry** to log the entry into the worksheet
- Click **Print Worksheet** to print the worksheet

Complete all entries for all MicroPlates in the batch. Once you are finished, click **Done** and your current worksheet will appear.

Click **Print** to print out the worksheet when you have completed the batch entry process.

> Note:
> *Be sure to print your worksheet and verify that all field information is correct.*



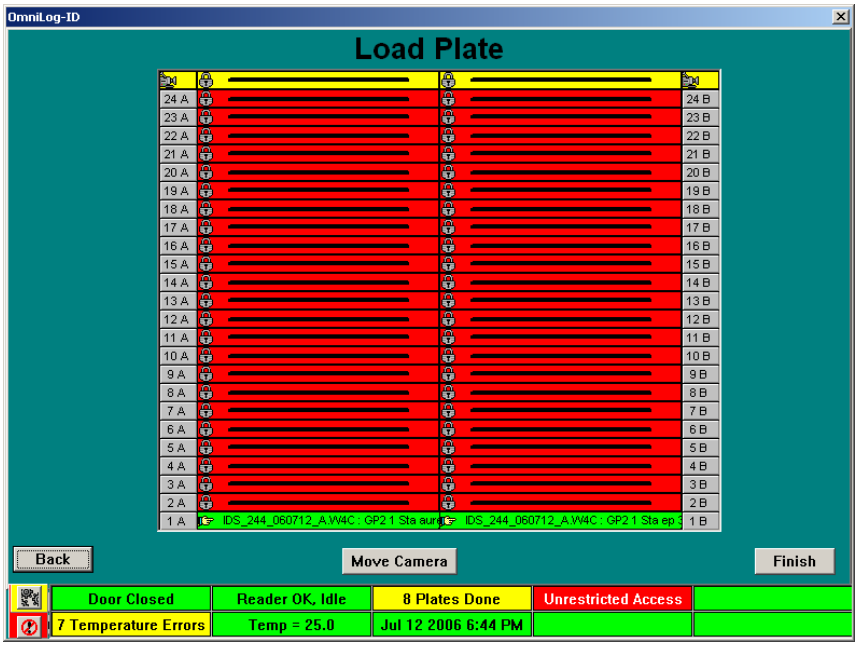
WORKSHEET (WITH ENTRIES)

At this point, it is a good idea to double-check your worksheet for errors. Make sure all required data is entered for each plate. If there are corrections that need to be made, simply click on the entry in the **Worksheet** window, to be taken back to the **Plate Information** window for that plate. At that point you may make your corrections.

Loading MicroPlates into the Incubator/Reader

The normal workflow for OmniLog ID is to prepare the samples, inoculate the MicroPlates, enter data into the computer, then load the MicroPlates into the incubator/reader. Load with the worksheet in your hand or use the configuration on the **Load** window to guide you through correct placement of the MicroPlates. See Section 7 if you've incubated the MicroPlates in an offline incubator.

1. After completing the worksheet and printing it out, click **Next** to load the MicroPlates. The **Load Plate** window appears. At this point, you can open the door without causing any error messages.



LOAD PLATE WINDOW

Caution!

Do NOT open the incubator/reader door when the footer bar shows the message "Reader Busy."

2. Check to make sure each MicroPlate is correctly labeled with a unique identifier. Do not write on the side or top of the MicroPlate lid, nor on the Biolog logo. The best place to label the MicroPlate is on the front bottom edge.
3. Load MicroPlates into the incubator/reader according to the rules of thumb on page 6.11.
4. As you begin to load each tray, check the position of the camera. If the camera is on the position to be loaded, click **Move Camera**. Follow instructions below.
5. When all MicroPlates and trays are in the proper slots, close the door firmly.
6. Click **Finish** in the lower right corner of the **Load Plate** window. This brings you to the **Read** window.

➔ **Remember: Do not take shortcuts when loading MicroPlates. Do not remove more than one tray at a time. Do not just pull trays out partially to insert MicroPlates. Do not use trays that have been sitting at room temperature. Trays must be kept at the set temperature of the incubator/reader for accurate incubation.**

RULES OF THUMB FOR LOADING BATCHES

1. Assess Batch

Is my batch going to incubate at 26-30°C? Does my batch contain MicroPlates that are difficult to set up? Am I a beginner at preparing samples and inoculating MicroPlates? If the answer to these questions is yes, break batch up into several batches (approximately 10 MicroPlates per batch).

2. Assess Stack Status

Before opening the door, check the Load Plates window, which shows the status of each stack slot.

A or B	⇒	Left (A) or right (B) stack column
Entry in each box	⇒	Gives sample identifiers
Red (with padlock)	⇒	Slot occupied by MicroPlate not yet read. Do not use.
Green(with hand icon)	⇒	OK to use this slot

3. Open Door

Open the incubator/reader door.

4. Remove Tray and Insert MicroPlate(s)

- Slide one tray out of its slot.
- Place tray on bench top.
- Insert 1 or 2 MicroPlates into that tray.
  - ⇒ Make sure "Biolog" logo faces front of tray (toward you).
  - ⇒ Make sure A1 well is in right rear corner.
  - ⇒ Make sure MicroPlate fits into slot and all four corners are well seated.
  - ⇒ Make sure MicroPlate lid is securely in place.

5. Replace Tray in Incubator/Reader

Slide the tray back into its exact slot in the incubator/reader.

- ⇒ Make sure you do not put tray into wrong slot.
- ⇒ If you do put tray in the wrong slot, the system will read it and identify it anyway, but the identification will not match that correct sample identifiers. OmniLog ID software cannot detect this kind of error. This depends on whether the slot is entered in a worksheet.

6. Repeat for all MicroPlates

- Remove next tray to be loaded.
- Place it on bench top.
- Insert 1 or 2 MicroPlates into that tray.
- Load into incubator/reader.

7. Watch the time!

Do not allow MicroPlates to sit on bench top for more than 20 minutes.

8. Close Door

WHAT ARE OMNILOG ID'S IDENTIFICATION CRITERIA?

- ⇒ An OmniLog ID is made when <u>two consecutive readings</u> with acceptable SIM values have the same ID call (exception: Immediate read).
- ⇒ An ID made during the 4-6 hour read will be saved and readings will stop for that MicroPlate (Normal Mode)
- ⇒ If no ID occurs in the 4-6 hour window, reads will begin again at 16 hours. Readings will occur every 30 minutes until the 22 hour read is complete or an ID is made
- ⇒ If an ID is made during the 16-22 hour read, it will be saved and readings will stop for that MicroPlate

HOW OFTEN DO READINGS TAKE PLACE?

⇒ Reads occur at 4-6 hours and at 16-22 hours
⇒ OmniLog ID reads every 30 minutes
⇒ These intervals occur every 30 clock minutes (at the hour and the half-hour), not 30 minutes from the time you loaded MicroPlates
⇒ Only MicroPlates that fall within these guidelines will be read

MOVING THE CAMERA WHEN LOADING MICROPLATES

In the normal course of operation, the camera in the incubator/reader moves from slot to slot as it reads MicroPlates. When not in use, it usually "parks" itself at the top row of the stack (slot 25). Occasionally it will park at slot 1. Wherever it parks, that tray locks into place; you will not be able to remove it for loading. If, for example, if the incubator/reader is empty and you are loading a batch of 50 MicroPlates, you will not be able to remove tray #25 until you move the camera out of the way. Occasionally the camera will move behind a slot while you have that tray out to load MicroPlates. In both cases, you must move the camera out of the way.

➔ If you encounter any difficulty inserting a tray all the way or closing the door because one tray is sticking out, it is most likely because the camera has locked that slot.
➔ DO NOT FORCE TRAYS INTO SLOT.
➔ Simply remove the tray and move the camera out of the way using OmniLog ID software.

To move the camera:

1. Remove the tray causing the problem.
2. Close the door.
3. Click **Move Camera** on the **Load Plates** window.

*Note: If you click **Move Camera** before closing the door, you will get an on-screen prompt to close the door.*

4. The camera will move to another slot. An on-screen message will appear, telling you when it's ok to open the door and resume loading that row.
5. Open the door and load the tray.

7. Special Functions

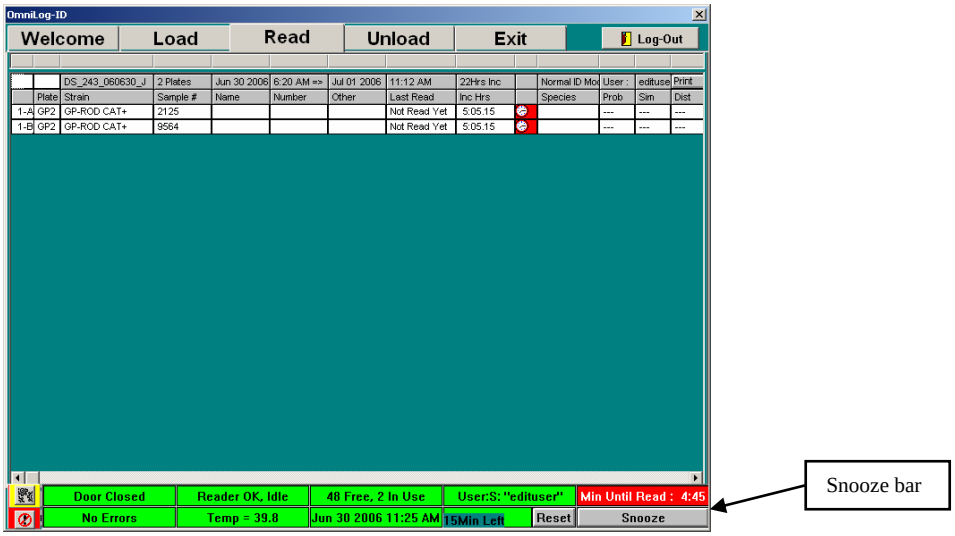
In this section:
➔Using the Snooze Bar
➔ Using an Offline Incubator
➔ Quitting the Program

OmniLog ID has several special functions that allow you to do the following:

- Get a little extra time before the next reading
- Remove a MicroPlate from a worksheet if an error has occurred in the preparation of that MicroPlate
- Perform an immediate read if you have incubated MicroPlates in a secondary, offline incubator
- Exit the program in special circumstances

Using the Snooze Bar

At times you may wish to gain a few extra minutes before the next reading. If, for example, the incubator/reader door is open and you are still loading and/or unloading MicroPlates, the footer bar may begin to blink red and say "Next Read 5 Min." Just below that entry, the Snooze bar will appear in yellow. Edit privilege is required.



READ WINDOW WITH SNOOZE

To gain extra time:

1. Click **Snooze**. The **Snooze** bar will disappear. You will have 2 more minutes. You can click the **Snooze** bar two more times, for increments of 5 minutes each time through one read time. If you try to click **Snooze** after a first skipped read, OmniLog ID will allow it, but make it more difficult for you. Clicking

Snooze again will result in a pop-up window asking "Are you sure you want to do that?"

2. These pop-up queries will time out after 2 minutes. If you have walked away with the door open, a message will appear saying "Door Open." An alarm will sound.

TIMING READINGS AND THE SNOOZE BAR

2:30	The door is open and you are unloading/loading MicroPlates. The "Next Read 5 Min" message appears in the footer bar. You click the **Snooze** bar.
2:35	"Next Read 5 Min" flashes again. You click the **Snooze** bar again.
2:40	"Next Read 5 Min" flashes again. You click the **Snooze** bar again. Because the incubator/reader reads on the hour and half-hour, it will skip one read.
3:00	The door is open and you are still unloading/loading MicroPlates. The "Next Read 5 Min" message appears in the footer bar. You click the **Snooze** bar. A message will appear, asking "Are you sure you want to do that?" You click **Yes**.
3:05	You are not quite done, so you click the **Snooze** bar again.
3:10	You need something from another room, so you leave. The door is open.
3:12	A "Door Open" message appears. An alarm sounds.

Using an Offline Incubator

Caution!

The majority of microbes grow at either 30 °C or 35 ° C. Do NOT set the OmniLog Incubator/ reader at 32 °C or 33 °C, hoping to cover both types. The incubator/reader MUST be set at the exact incubation temperature.

At times you may want to use a second incubator, then place the incubated MicroPlates into the incubator/reader for immediate reading. This is especially helpful in the following circumstances:

- If your suspected microbe requires a special atmosphere, such as 6% CO2.
- If your suspected microbe requires incubation at a temperature different from the current incubator/reader temperature, and you don't wish to reset the temperature.

1. Prepare samples according to Section 5.
2. Incubate MicroPlates in an offline incubator for the appropriate length of time.
3. Load MicroPlates into the incubator/reader as described in Section 6.

4. Click the **Normal Read** radio button on the worksheet setup window to read the MicroPlate more than once.
5. The **Setup Time** field will change to **Read Time**. Enter the amount of time the MicroPlate was incubated in the secondary incubator.
6. Enter sample information on the **Worksheet Setup** window, as described in Section 6.
7. Proceed with loading and reading as described in Section 6.
8. OmniLog ID will immediately read MicroPlates marked as "Immediate Read" (it will not wait until the next hour or half-hour).

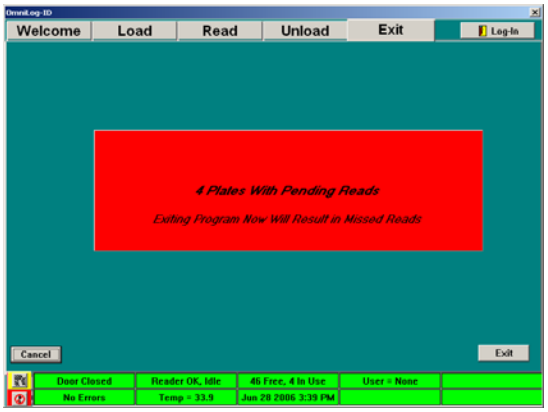
Quitting the Program

> **Caution!**
> *Quitting the program while there are pending reads will cause you to miss readings. Except when data loss is unavoidable, make sure the program and incubator/reader are on while there are pending MicroPlates in the system.*

Since the computer you purchased with the system is dedicated to the OmniLog Incubator/reader, you should not run any non-Biolog programs on it.

If you do need to quit the program for routine re-booting (or for example, to move the OmniLog Incubator/Reader to another location), the program will save all current MicroPlate information and data to files. When you start the OmniLog program back up, the software will retrieve all the MicroPlate information in it when you quit the program. It will resume all pending reads, using a current time as the read time (not the plate setup time). If you quit the program while readings are pending, you will lose all the readings that would have occurred while the system was off.

1. Click **Exit** on the **Welcome** screen menu bar. A pending read status warning will appear in the center of the screen. If there are pending reads, the warning box will be red; if not, the box will be green and the message will say "OK to exit."



EXIT WINDOW

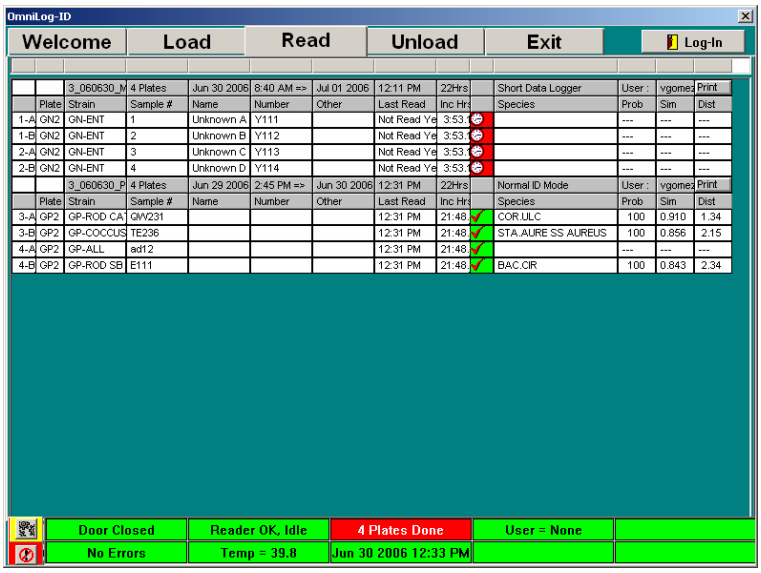
2. Click **Exit**. OmniLog ID will close.

8. Interpreting Results

In this section:
- **➔Assessing the Accuracy of your ID**
- **➔Pinning Down an Uncertain ID**

During normal operation, the Read window will display. As OmniLog ID makes identifications, the results will show for all MicroPlates in all current worksheets. The worksheets are shown in the order in which they were loaded, with the one that's been in the longest on top. Scroll down to see all results.

Each worksheet begins with a two-row header (the top one is yellow, the one beneath it, gray).



READ WINDOW (WITH RESULTS)

Table 8-1 explains the column headings on the **Read** window.

TABLE 8.1. READ WINDOW COLUMNS

Column Heading	What It Means
Heading 1 (yellow)	
001029A.W4C	File name yy/mm/dd/worksheet code
7 plates	Number of plates in a batch
Oct 27 2000	Setup date
1:48 PM ⇒	Time run began
Oct 30 2000	Current date
1:31 PM	Current time
24 hrs Inc	Time set for incubation

Column Heading	What It Means
Heading 2 (gray)	
Tray	The designated tray position
Plate	The type of MicroPlate used for that sample
Strain	Strain type
Sample Number	The sample number you assigned that MicroPlate
Name	The classification of that microbe
Number	Strain number
Other	Other pertinent information you entered
Last Read	When MicroPlate was read last
Inc. Hrs	How long the MicroPlate has been incubating
ID	Shows whether result is in-progress or final • green box with red checkmark means final ID • red box with clock face means in-progress ID or not read yet • in-progress results are updated every 30 minutes, at each reading
Species	Gives full identification of microbe If this area is blank, no reading has been done yet.
Prob	Confidence probability of a called ID
Sim	ID Score value
Dis	Equivalent number of mismatches

*Note: The headings on the **Read** window worksheets reflect the information you selected during worksheet setup. As a result, these headings will change depending on your data entered.*

Possible IDCall Results

- Species ID
- Genus ID
- NO ID
- Too Few Positives
- Too Few Matching Positives
- Too Many Borderlines

1. Check the **Read** window for in-progress and final identifications.
2. For more detailed results, click on any part of any row in the **Read** window. A **Plate Data** window will appear for that MicroPlate.

If you get a "No Identification" result, the % Prob value will not be displayed. When this happens, check for black + and – signs in the on-screen MicroPlate.

- If there are both + and – random mismatches, this is probably a true mismatch. If so, this is probably a species not in Biolog's database. You can add it to your own user-created database *(using RetroSpect Trending and Tracking software).*

- If the mismatches are all + or all –, you may have made a testing error. Refer to Table 8-2, and see Section ***12***.

Table 8-2 will assist you in figuring out the cause of these mismatches:

Mismatch Type	What It Might Mean
All + (your pattern is giving fewer positive reactions than the species you're comparing it to)	Under-inoculation
	A1 well is overfilled, contains clumps, or is cloudy
	Cells were mishandled, too old, cultured on wrong medium, suspended in wrong inoculating fluid, incubated at wrong temperature, etc.
All – (your pattern is giving more positive reactions than the species you're comparing it to)	Over-inoculation (especially with enterics)
	A1 well is underfilled
	Contamination (mixed culture)

TABLE 8-2. ASSESSING MISMATCHES

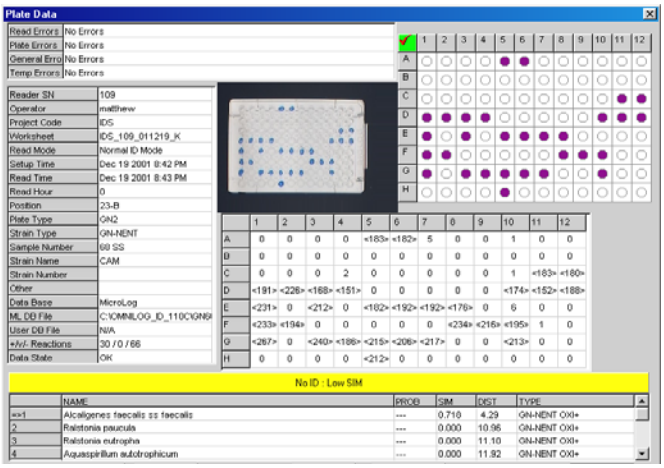


PLATE DATA WINDOW

Assessing the Accuracy of Your ID

The OmniLog® 1.X series software measures the goodness of the ID based on two criteria: "Match" and Separation". A value is derived for both of these concepts based on the Distance (DIST). The DIST value indicates how many mismatched reactions the test organism has to the reference organism in the database. "Match" is a measure of how good of an absolute match the data is to the choices selected in the database. The smaller the DIST, the greater the match. Separation" is the difference in distance between the first choice and all of the other choices. These two values are then multiplied together to get a final net ID score. That final number is called "SIM" in the MicroLog and OmniLog systems.

The match score itself constantly decreases with increasing distance. The value for separation by itself is shown as "PROB" when an ID is called. If the fist choice and the second choice were the exact same distance from the entered data, then the PROB would be 0.5. The true separation PROB takes into account the other matches. If the first three choices all had the same distance, the PROB for all three would be 0.3333, and so on. As the differences in the distances gets larger, the PROB goes up. At a difference in distances of 1.0, the PROB is 0.950. At a difference in differences of 2.0, the PROB is 0.997.

If a well result does not match the result in the database for the organism in question plus/minus mismatch indicators are visible on the screen and on the printout for the original read for that well. If the read is positive on the MicroPlate, <#>, and the database result for that well is negative the printout shows <# - to indicate a mismatch where the database reaction is negative. If you have a negative read, # with no brackets and database value for that well is positive the well will read # + indicating a positive reaction in the database. At the time of a read the data is compared to the database to determine the ID.

The **Read** window gives the first ID choice for each microbe. To see the top 10 choices for an ID, click any row on the **Read** window. The first four choices will show in the lower section of the **Results** window. Scroll down to view all 10.

If the answer to the following three questions is yes, you can feel confident that ID #1 is accurate.

- Are the top-ranked ID choices on the list all the same (or closely related) genera?
- Check the SIM (similarity index value) rating of ID #1. Is it 0.90 or above at 4-6 hours? Is it 0.50 or above at 16-22 hours?
- Check the DIST (distance) rating of ID #1. Is it 0.50 or less?

Pinning Down an Uncertain ID

If the top-rated choices show any of the following results, you may want to do some additional probing:

- The top-rated ID choices on the list are random and unrelated genera
- SIM is near 0.50

Understanding the language of microbe identification:

% PROB – confidence probability of a called ID
SIM – calling criteria value
DIST – equivalent number of mismatches

- DIST is greater than 5.00
- DIST of the first and second choices are nearly equal (within 1?)
- There are many variable reactions (more than 15)

For additional assistance in interpreting results, contact Biolog Technical Service.

ID Rules of Thumb:
SIM = 1.0 ➔ a perfect match
SIM = 0.0 ➔ no match
The closer to 1.0, the better the match.

The chart below will help you clarify your identification by using SIM and DIST values:

USING SIM AND DIST TO ASSESS IDENTIFICATIONS

Assess SIM for ID #1

Gram-negative aerobes	➔ must be ≥ 0.50 at 16-22 hours incubation
Gram-positive aerobes	➔ must be ≥ 0.90 at 4-6 hours incubation

Assess SIM for top IDs

If SIMs for top IDs are < 0.50 **AND** all belong to the same genus **AND** if their total is > 0.50, you can be confident that the microbe is in that genus. MicroLog will give you a genus-level ID rather than a species-level ID.

Assess DIST for top IDs

If SIM is OK, but DIST between ID#1 and ID#2 are very close	➔ Good match to both species (some are quite close)
If you remain unconfident of the ID, try to differentiate organisms by performing one of these tests	➔ Gram stain, colony morphology, oxidase and/or catalase tests, additional tests (see *Bergey's Manual*)

9. Unloading MicroPlates

In this section:
➔Checking Unload Status
➔Removing MicroPlates
➔Marking MicroPlates as Done
➔Understanding Naming Conventions

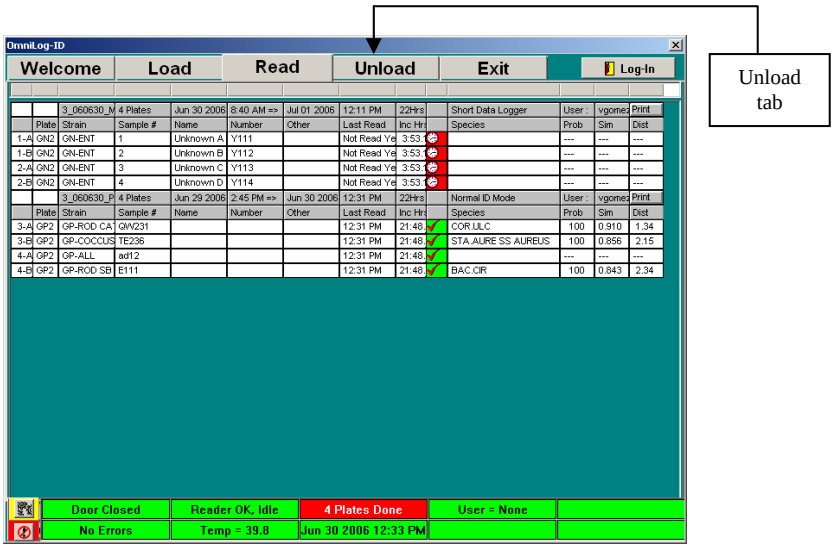
Removing MicroPlates from the incubator/reader requires only a few easy steps:

- Check the status of all MicroPlates to see which ones are ready to be unloaded
- Make sure that IDs have printed out
- Remove MicroPlates that are ready for unloading
- Check status again

Checking Unload Status

When MicroPlates are ready to be unloaded, the footer bar will let you know by reporting "X Plates Done" (X = the number of MicroPlates finished). During operation, the Read window will be displayed during incubation and reading MicroPlates. The Read window allows you to view the batches and the MicroPlate status.

Once you open the door, you have 20 minutes to load and unload MicroPlates. If you need more time, activate the Snooze bar.

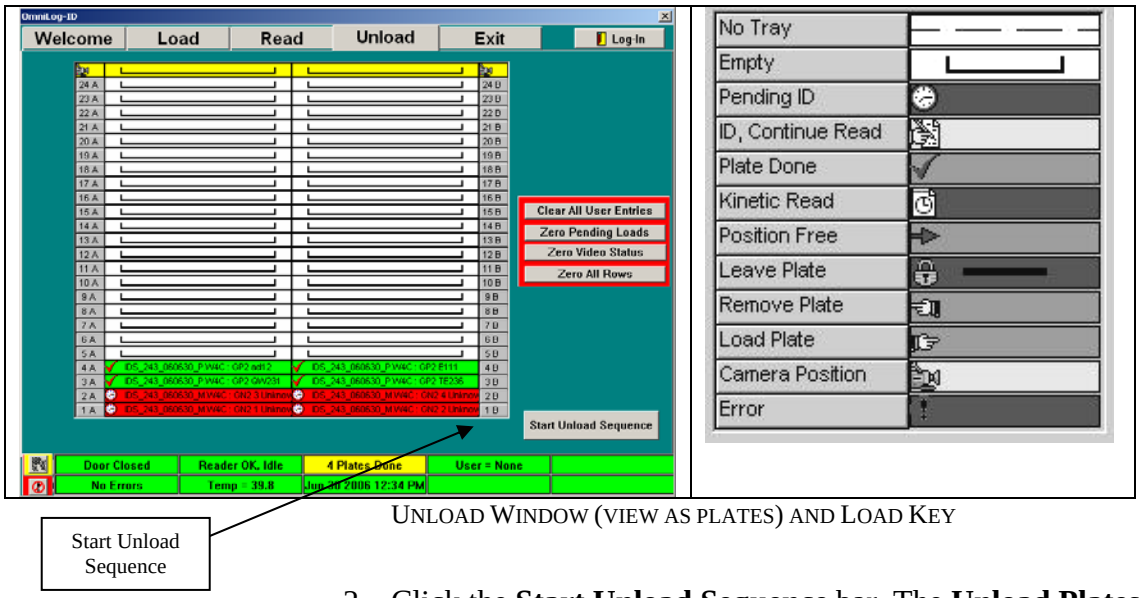


READ WINDOW

1. When the **Read** window indicates that some MicroPlates are ready to be unloaded, click **Unload** on the top menu bar. The **Unload** window shows a picture of the tray stack, indicating current status (see Table 9-1 for explanation of symbols). You can click on any row to see the **Unload Key.** Check to ascertain which MicroPlates are ready for removal.

TABLE 9-1: UNLOAD WINDOW SYMBOLS

Key	Explanation
Numbers along left and right edges	Numbers correlate to tray numbers, starting with number 1 at the bottom through number 25 at the top
A and B designations along left and right edges	A = left column of MicroPlates B = right column of MicroPlates
White slots with ----------	Slot empty of both MicroPlates and tray
White slots with [_____]	Slot contains tray, but not MicroPlate
Green background with red checkmark icon	Slots that contain MicroPlates that have been read and are ready to be removed
Yellow background with hand writing icon	Slots containing MicroPlates that have been read but are not ready to be removed. Data still saving.
Red background with clock icon	Slots containing plates that have not been read yet



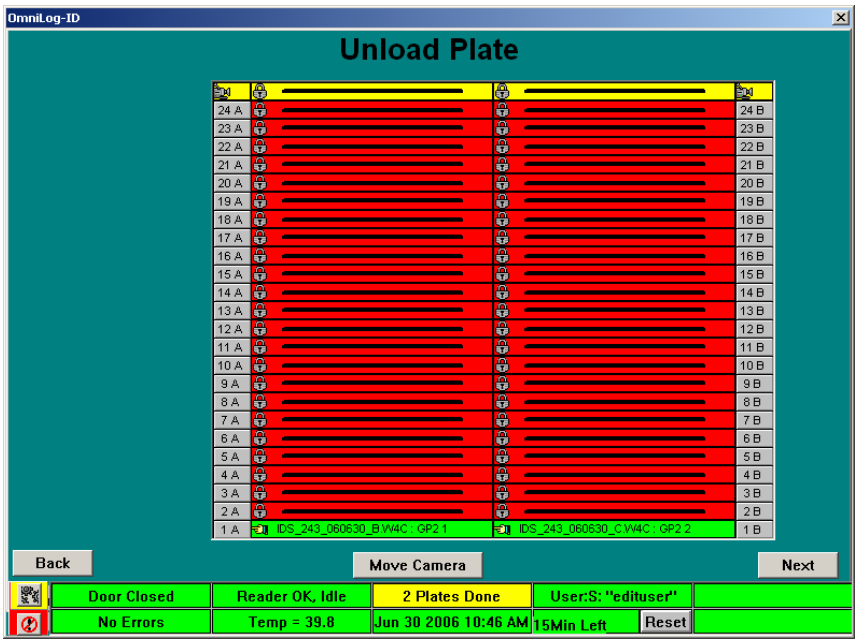
UNLOAD WINDOW (VIEW AS PLATES) AND LOAD KEY

2. Click the **Start Unload Sequence** bar. The **Unload Plates** window appears.

Removing MicroPlates

3. Open the incubator/reader door.
4. Follow the list on the **Unload Plates** window to remove the correct MicroPlates.

Note: The Snooze button can give you more time before the next read. See Section 7 for details.



UNLOAD PLATE SCREEN (PLATES DONE)

5. Remove only one tray at a time. Slide the tray completely out of the incubator/reader.
6. Place the tray on the workbench.
7. Remove the appropriate MicroPlate(s) from the tray.
8. Put the tray back into the same slot in the incubator/reader.
9. If the camera has parked itself into slot behind a tray you wish to remove and you cannot get the tray out, click **Move Camera**. See Section 6 for details.
10. After you've removed all the desired MicroPlates, close the door.
11. Click **Next** in the lower right corner of the **Unload Plates** window. The software returns you to the **Read** window. This worksheet is no longer active.
12. If you wish to load new MicroPlates while the door is open, complete unloading first. Then load according to instructions in Section 6. Remember, you have 20 minutes to complete an entire unload/load cycle.

Caution!

It is up to you to remove the correct MicroPlates. The incubator/reader cannot detect if you are removing MicroPlates not listed as "Done" on the Unload Plates window.

Marking MicroPlates As Done

Note: To Mark MicroPlates as Done, Users must have Edit privileges, or Program Administrator

During normal operation, the Read window will display. As you track the progress of readings, you may occasionally detect, in your judgment, a clearly erroneous identification by the OmniLog incubator/reader. This may occur if a sample has been mis-prepared, a MicroPlate incorrectly inoculated or incorrectly labeled.

Rather than proceed with a final reading of that MicroPlate, you can clear it from its worksheet. To clear a MicroPlate record during the read process in Restricted Access mode,

1. Click on the appropriate row in the **Read** window. The **Plate Data** window appears.

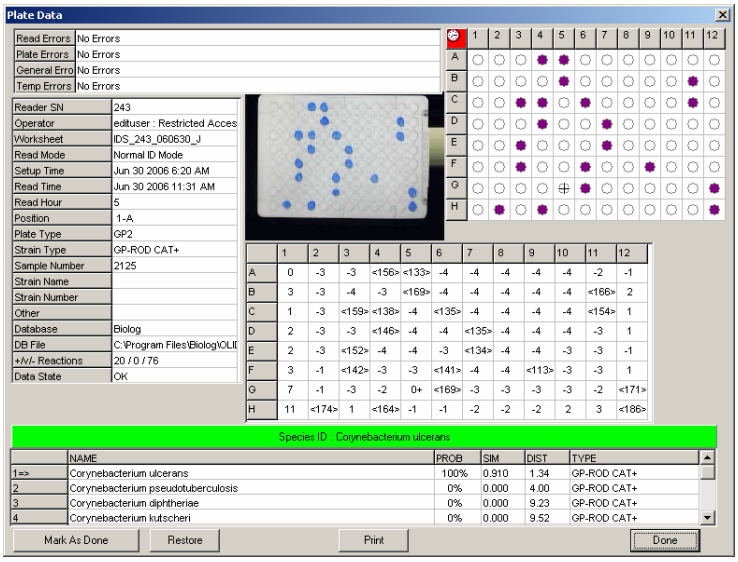


Plate Data
Read Errors No Errors
Plate Errors No Errors
General Erro No Errors
Temp Errors No Errors
Reader SN 243
Operator edituser : Restricted Acces
Worksheet IDS_243_060630_J
Read Mode Normal ID Mode
Setup Time Jun 30 2006 6:20 AM
Read Time Jun 30 2006 11:31 AM
Read Hour 5
Position 1-A
Plate Type GP2
Strain Type GP-ROD CAT+
Sample Number 2125
Strain Name
Strain Number
Other
Database Biolog
DB File C:\Program Files\Biolog\OLI
+/-/- Reactions 20 / 0 / 76
Data State OK
Species ID : Corynebacterium ulcerans
NAME PROB SIM DIST TYPE
1=> Corynebacterium ulcerans 100% 0.910 1.34 GP-ROD CAT+
2 Corynebacterium pseudotuberculosis 0% 0.000 4.00 GP-ROD CAT+
3 Corynebacterium diphtheriae 0% 0.000 9.23 GP-ROD CAT+
4 Corynebacterium kutscheri 0% 0.000 9.52 GP-ROD CAT+
Mark As Done
Restore
Print
Done

PLATE DATA WINDOW

2. Click Mark as Done. That entry will now be marked as "Done" on the **Read** window listing.
3. To restore the entry, click **Restore**.
4. Click **Done**. The program will return to the **Read** window.

Understanding Naming Conventions

Before using the advanced data management functions available in the OmniLog software, it is important to understand how worksheets and data files are named. File names and pathways are created automatically. They are keyed to the setup date of the worksheet and the worksheet code letter. All worksheet and data files generated by the software will fall into this automatically defined and created path.

Table 10.1 shows these conventions:

TABLE 10.1: FILE NAME AND PATHWAY NAMING FORMATS

File Type	Automatic Coding	Example
Path	**Path**: Program project path\data YYYY\MM\ = "Data_" + 4 digit year\2 digit month	IDS project, data for March, 2001 = C:\OLID_IDS\data_2001\03\
Worksheet	Project Code_Serial number_ YYMMDD_worksheet code.W4C = 3 letter Project code, 3 digit Serial number, 2 digit year, 2 digit month, 2 digit day, X = code letter	worksheet for March 13, 2001, A = 010313A.W4C (*Note: you'll never need to access a worksheet file)*
Normal Mode Data	Worksheet name + "I" + ".D4C"	Normal data for March 13, 2001, = 010313AI.D4C *(Note: All plates in worksheet are saved into this file. "I" = ID; this is your record of how MicroPlates are identified.)*
Short Data Log Data	Worksheet name + 'S_" + position + ".D4C"	Plate in position 5A on March 13, 2001, A = 010313AS_05A.D4C *(Note: There will be a separate data file for each MicroPlate in the worksheet. "S" = Short Log. This is a first and last read log of each read time period. This mode is useful when collecting data for your own database.)*
Full Data Log Data	Worksheet name + 'L_" + position + ".D4C"	Plate in position 15B on March 13, 2001, A = 0010313AL_15B.D4C *(Note: There will be a separate data file for each MicroPlate in the Worksheet. "L" = Log. This is a full log of all readings)* *This mode is also useful when collecting data for your own database.)*

10. Technical Notes

In this section:
➔Materials List
➔Media Preparation

This section gives specific information regarding consumable materials you'll need to perform microbial identifications, as well as instructions for how to prepare isolation media and inoculating fluid.

Materials List

	Item	Description
Media	BUG + B	Growth medium for gram-negative and gram-positive bacteria
	BUG + M	Growth medium for gram-positive spore-forming rods
	BUG	Growth medium for agricultural bacteria
	CHOC	Growth medium for fastidious gram-negative bacteria
Inoculating Fluid	GN/GP-IF	Inoculating fluid for gram-negative and gram-positive bacteria
	Salicylate	Inoculating fluid additive for some microbes
	Thioglycolate	Inoculating fluid additive for some microbes (available in droppers)
Miscellaneous Supplies	Streakerz	Sterile 6" pointed streaking sticks
	LongSwabs™	Sterile 7" cotton-tipped swabs
	Transfer pipettes	Sterile 9" disposable pipettes, graduated tip, 5 ml
	Reagent reservoirs	Sterile reservoirs
	Pipette tips	Sterile, racked, for repeating multichannel pipetter
MicroPlates	GN2 MicroPlates	MicroPlates for gram-negative bacteria
	GP2 MicroPlates	MicroPlates for gram-positive bacteria

Media Preparation

Biolog can provide you with all the pre-made media you will need for microbe identification. However, you can also prepare your own media, using Biolog's formulas.

Making Biolog Universal Growth Agar + blood (BUG + B)

> Caution!
> *If you're making your own media, follow instructions exactly. Take care to avoid contamination.*

1. Mix the following in a 2-3 liter container:

   57 grams BUG Agar

   950 ml purified, distilled, or deionized water
2. Gently boil mixture while stirring to dissolve the agar and other components.
3. Cool an aliquot and measure the pH. Adjust pH with NaOH or HCl to achieve a final pH of 7.3 $\pm$ 0.1 at 25° C.
4. Sterilize by autoclaving at 15 pounds of pressure and 121° C for 15 minutes.
5. Cool to 45-50° C.
6. Add 50 ml sterile fresh defibrinated sheep's blood just prior to dispensing and mix gently. (Use good quality blood with a hematocrit of at least 40%).
7. Dispense into sterile petri dishes.

Making Biolog Universal Growth Agar + maltose (BUG + M)

1. Follow steps 1-5 above for BUG + B, except use 990 ml purified water.
2. Add 10 ml sterile solution of 25% maltose and mix thoroughly.
3. Dispense into sterile petri dishes.

Making Biolog Universal Growth Agar (BUG)

1. Mix the following in a 2-3 liter flask:

   57 grams BUG Agar

   1,000 ml purified, distilled, or deionized water
2. Gently boil while stirring to dissolve the agar and other components.
3. Cool an aliquot and measure the pH. Adjust pH with NaOH or HCl to achieve a final pH of 7.3 + 0.1.
4. Sterilize by autoclaving at 15 pounds of pressure, at 121° C, for 15 minutes.
5. Cool to 45-50° C.
6. Dispense into sterile petri dishes.

General hints for culture media preparation

☑ Keep dehydrated media powder in original bottles with lids tightly closed to avoid water absorption and deterioration.

☑ Use clean dry glassware that has been rinsed free of all soap residue.

☑ Add water to the vessel first, then weigh agar powder and add it to the vessel. Mix to obtain an even suspension. Do NOT fill the vessel more than two-thirds full (to avoid boiling over during heating and autoclaving).

☑ Heat agar gently, with constant stirring.

Making inoculating fluid (GN/GP-IF)

Biolog supplies pre-made inoculating fluid, with the following composition:

0.40% sodium chloride (NaCl)

0.03% Pluronic F-68 (e.g., Sigma #P7061)

0.02% Gellan Gum (e.g., Phytagel™, Sigma #P8169)

However, if you wish to prepare your own, using Biolog's formula.

1. Add 0.2 gm Gellan Gum to 1 liter of H2O.
2. Heat to boiling, stirring constantly, until the Gellan Gum is completely dissolved.
3. Turn off the heat but continue stirring.
4. Add 4 gm NaCl and continue stirring until the NaCl is completely dissolved.
5. Add 0.3 gm of Pluronic F-68. Continue stirring until the Pluronic F-68 is completely dissolved.
6. Dispense the volume appropriate to obtain 19 ml post-autoclaving into 20 x 150 tubes.
7. Sterilize by autoclaving at 15 pounds of pressure and 121° C for 30 minutes.

Note: Gellan Gum concentration of 0.01-0.02% is acceptable.

11. Frequently Asked Questions

In this section:
➔Answers to Common Questions

Q *How I should I store my MicroPlates?*

A Unpack MicroPlates as soon as you receive them and keep them refrigerated until use. Biolog MicroPlates should be kept refrigerated (not frozen). MicroPlates are fairly stable at room temperature; we suggest refrigeration because they must be kept cold for maximum shelf life. At moderately warm temperatures, they slowly begin to deteriorate. Visually examine MicroPlates before using them. You may see faint yellow-brown or pink shades in wells when they are dry (this is OK). However, if wells show significant color immediately after inoculating the MicroPlate with the cell suspension, they have most likely been heat damaged.

Q *Do I have to handle frozen or lyophilized cultures in a special way?*

A Yes. Subculture frozen or lyophilized cultures two to three times before testing.

Q *Our lab would really like to use our own media. We know that our strains will grow on it. Is that all right?*

A No. However tempting it may be to use nonrecommended media, using anything other than Biolog-recommended media is a mistake. The carbon source tests in our MicroPlates are configured for precise metabolic reactions. The metabolic state of an organism has a profound influence on the resulting MicroPlate pattern that is the basis for identification. Many species will give fewer positive reactions when grown on non-recommended media. Use Biolog-recommended media only!

Q *Why is there a defined range for the turbidity of inocula?*

A It is essential to prepare inocula in a consistent and precise manner. The Biolog redox test chemistry is sensitive to oxygen concentration, which is determined by cell density. Use Biolog turbidity standards and calibrate your turbidimeter.

Q *Are Biolog's Turbidity standards comparable to McFarland standards?*

A Biolog's Turbidity standards have different set points and are not comparable to McFarland standards. Biolog's standards are set for cell densities at which the Biolog test performs optimally. Use of Biolog standards is necessary to achieve consistent and accurate results.

Q *Can I use one incubator for all my strains and set it at32°-33°c instead of having two incubators at 30°c and 35°-37°c respectively?*

A Organisms grow better depending on the temperature of their environment. Biolog has chosen the temperatures at which the organisms in our database grow optimally. Using different temperatures than those recommended will decrease the performance of your Biolog ID system.

Q *We read our MicroPlates visually. Occasionally we are unsure whether a reaction is positive or negative. How should we enter those wells?*

A Light purple reactions are considered positive as long as the color is noticeable when compared to the A1 reference well. However, if you're still unsure, enter these reactions as "borderline." If, for example, you enter 4 out of 95 tests as borderline, OmniLog software will ignore the 4 borderline tests and base its identification on the remaining 91 tests. This will give you far more accurate results than guessing wrong about reactions you're not sure of.

Q *What should I do if I get different ID results at 4 hours and at 24 hours?*

A This is most often the result of having a mixed culture. See Section 4 for recommended procedures and examine your culture carefully to see if it is mixed. Also, consider the similarity value at one incubation time vs. the other. Environmental strains will often grow a little differently than the lab strains used to make the databases. Some strains may have a high similarity in our 4 hour database, while others match our 24 hour database more closely. Compare your similarity values to see which is a better match.

Q *Are there any genera where the taxonomy is still undergoing change?*

A Taxonomists have not yet agreed upon how all species should be delineated and microbiology is an ever-evolving science. We update and expand our software library on a continual basis, but at this point there are certain genera still undergoing revision. These include *Bacillus*, *Corynebacterium*, *Enterobacter*, *Pseudomonas*, *Aeromonas*, *Vibrio*, *Acinetobacter*, *Moraxella*, *Clostridium*, and *Candida*.
www.dsmz.de/bactnom is a good site for current bacterial nomenclature. You can also link to this site through Biolog's web page. **www.cbs.knaw.nl** is a good site for current yeast and filamentous fungi nomenclature and information.
Remember, you can always call Biolog Technical Services with any identification questions.

Q *Our lab is interested in your quality control and validation procedures. Where do we get this information?*

A Refer to the package insert and call Biolog Technical Services. Request our Validation Package information, Material Safety Data Sheets, Quality Control organism information, and Certificates of Performance.

12. Troubleshooting

In this section:
- **Gram Stain Identification**
- **Culturing Microorganisms**
- **Preparing Inocula**
- **Inoculating MicroPlates**
- **Incubating MicroPlates**
- **OmniLog Incubator/Reader**

Carefully following the instructions in this guide will greatly minimize problems. Occasionally, however, you may get stuck or encounter difficulties. This section addresses the symptoms, causes, and solutions to those occasional problems. If you still can't figure out the cause of the problem, call Biolog Technical Service. We're always glad to help.

Additional help can be found on Biolog's website at www.biolog.com, and in our technical bulletin, MicroLog Minutes.

Gram Stain Identification

Since Gram stain readings start the chain of steps leading to an OmniLog identification, it's essential to perform them according to standard lab protocol and to interpret results correctly.

☑ View the smear with a light microscope, using the oil-immersion objective. Gram-positive bacteria appear blue or violet; gram-negative bacteria appear pink or red.

☑ Gram-negative bacteria may appear gram positive if the smear is too thick and decolorization is incomplete.

☑ Gram-positive bacteria may appear gram negative if the smear is over-decolorized. This can also occur if the culture is not fresh and has reached stationary phase (some *Bacillus* species are gram positive for only a few divisions after spore germination). In addition, gram-positive bacteria will appear gram negative if the integrity of their cell walls is damaged.

☑ To prevent misidentification, prepare light smears of young, actively growing cultures. Use known gram-positive and gram-negative controls. When you're determining organism morphology, perform Gram stains from liquid medium. Solid agar can affect the appearance of the organism.

Symptom	Cause	Solution
Gram variability	Smear is too thick	Make a single-cell-layer smear. Run positive and negative controls.
All smears appear gram negative	Over warming of slides	Air dry slides completely before warming. Don't use a flame to fix slides.
	Using old cultures	Prepare slides from fresh log-phase growth cultures.
	Over-decolorizing	Repeat Gram stain, using specified timing. Run positive and negative controls.
Morphology unclear	Growth on agar media affects morphological appearance	Do a Gram stain from broth culture.
Too-intense color	Under-decolorizing	Use decolorizer made by same company that makes your stains. Prepare decolorizer or acetone/alcohol at several concentrations. Test solutions at 5, 10, and 15 seconds with known positive, negative, and weakly positive cultures. Run positive and negative controls.

Additional differentiation techniques

Make sure you're using proper Gram stain procedure. If you still get ambiguous results, use the following table as a guide:

Test	Reactions
Vancomycin sensitivity (30 μg disks)	Gram-negative bacteria ➔ resistant Gram-positive bacteria ➔ most are sensitive
Growth on MacConkey and CNA plates	Gram-negative bacteria ➔ MacConkey +, CNA – Gram-positive bacteria ➔ MacConkey –, CNA +
KOH test (3%)*	Gram-negative bacteria ➔ suspension becomes thick and stringy
L-alanine aminopeptidase activity (use commercially available test strips impregnated with a colorimetric substrate for this enzyme)*	Gram-negative bacteria ➔ + Gram-positive bacteria ➔ –

*For test procedures, see *Bailey & Scott's Diagnostic Microbiology*, Baron E.J. and Finegold, S.M., C.V. Mosby Co., 1990, pages 102-103.

Culturing Microorganisms

Symptom	Cause	Solution
Poor overall growth	Using nonrecommended media	Use Biolog-recommended media.
Isolate takes several days to form a colony	Some environmental organisms take several days to become visible on growth plate, at which point culture may be too old for successful ID	Subculture one or two passages in broth medium. Set up two or three agar plates to obtain sufficient growth.
Bacterium will not grow on BUG + B or forms pinpoint colonies	Fastidious gram-negative bacteria need special culture conditions	Use Chocolate agar and incubate with elevated CO_2 at 35-37° C.
	Some environmental bacteria may be oligotrophic or temporarily in an oligotrophic state (i.e., they will only grow on low nutrient media such as R2A)	Try to subculture the bacterium from R2A and see if they will gradually adapt to growing on BUG + B. If not, it is a species that is not included in our Biolog database. Agricultural bacteria may be grown on BUG without blood.
Slow growth and/or weak pattern formation	Sub-optimal growth temperature and/or humidity and/or atmosphere	Use specified incubating temperatures (see Section 4 and Appendices). If your unknown organism came from a cold or warm environment, grow it first at its environmental temperature, then try to grow it at 35-37° C, 30° C, or 26° C. Add a pan of water to provide humidity in your incubator. Incubate the MicroPlate at the same temperature as the growth plate.
Mixed growth on agar plates	Sticky bacterial surfaces	Transfer a colony into a few ml of GN/GP-If or sterile water, vortex for several seconds, and streak out from the cell suspension onto a medium that aids the detection of subtle differences in colony morphology. Take a single colony and streak for isolation on a separate plate. Repeat as necessary until you have a pure culture.

Preparing Inocula

Symptom	Cause	Solution
Incorrect turbidity	Turbidimeter out of calibration	Calibrate accurately. Use correct standards. Make sure standards have not expired.
	Tubes not properly blanked	Once you blank a tube, do not rotate it while making suspension. Blank each suspension tube (tubes are not optically precise and can vary tube-to-tube and with rotation)
	Significant scratches or smudges on tube	Use suspension tubes only once, then discard. Visually inspect tubes before using. Wipe outside of tubes with a tissue before placing in turbidimeter.
Inaccurate %T measurements	Nonuniform suspension of cells	Use 7" swab to mix cells all the way to the bottom of the tube. The light path that looks through the tube is only viewing the bottom of the tube.
Trouble making a homogenous suspension	Mucoid or clumpy cells	For Spore Forming Gram positive Rods, Follow the recommendations on pages 5.7 to 5.10.
		For Non-Spore formers: 1. Roll swab over young colonies in 3rd and 4th quadrants. 2. Mash colonies against side of a sterile tube (above meniscus). 3. Add several ml of inoculating fluid and wash the sides of the tube with a cotton swab. 4. Mix well, then examine for clumps. If clumps are present, allow them to settle. 5. Transfer this concentrated inoculum into a fresh Inoculating Fluid tube until the recommended turbidity is reached. * Be careful not to transfer any colony clumps into the Inoculating fluid
		1. For difficult organisms such as *Gordonia* or *Tsukamurella*, suspend colonies as a dense suspension in a small amount of inoculating fluid as above. 2. Incubate as needed at 35° C (do not exceed 10 minutes). Vortex (if clumps still present, pull off supernatant and repeat). 3. Bring supernatant volume up to 18 ml and vortex until homogenous.
Too few positive reactions in MicroPlates	Detergent traces in tube	Use suspension tubes only once, then discard.
	Use of "bad" water	Use high quality purified water without preservatives.

Inoculating MicroPlates

Symptom	Cause	Solution
Pipetting problems	Wells inoculated unevenly	Dispense first aliquot from pipettor back into reservoir. Depress lever smoothly and completely. Make sure tips are lined up evenly and tightly seated. Avoid pipetting or trapping air bubbles. Visually check wells after inoculating.
	Incorrect volumes used	150 µl for aerobic bacteria.

Incubating MicroPlates

Symptom	Cause	Solution
Poor growth or poor pattern formation in MicroPlates	Wrong incubation conditions Wrong MicroPlate Organism not in Database	Incubate according to specified temperature and conditions. See Section 5 and Appendices. Incubate the MicroPlate at the same temperature as the growth plate. Make sure incubator humidity is sufficient.

OmniLog Incubator/Reader

Symptom	Cause	Solution
Erratic or inaccurate reading	Moisture, scratches, or smudges on MicroPlate	If using an off-line incubator, wipe bottom of MicroPlate before putting into incubator/reader.
	Many borderline reactions on MicroPlate	Review all sample preparation procedures for correctness and accuracy.
Software won't communicate with or initialize incubator/reader	Wrong com port selected	Choose correct com port.
	Loose cable connection	Turn incubator/reader off. Unplug cable, then plug it back in. Turn incubator/reader on and try again.
	Unknown cause	The incubator/reader has its own error messages, which should be self-explanatory. Call Biolog Technical Service if you need further assistance.
MicroPlate won't go into incubator/reader	MicroPlate mispositioned	Make sure MicroPlate into place and is seated levelly. Make sure MicroPlate lid is on. Remove MicroPlate and reposition in incubator/reader tray. Make sure A1 well is at the right rear. Verify that software is communicating with incubator/reader.
	Camera assembly is in the way	Click **Move Camera** selection bar on the **Load Plates** window to move camera out of the way.
Software can't contact the incubator/reader via the serial port	Loose cable or incorrectly installed cable	Make sure the serial cable is connected to serial port #1 on the incubator/reader (this will be the lower plug).
No video signal (footer bar error message "Video Error")	Loose or incorrectly installed cable	Click on the "Video Error" message on the footer bar. If you get a message reading "No Signal", check the video cable at the back of the incubator/reader. The cable should go from a special plug at the back of the computer to the upper plug at the back of the incubator/reader.
Specified error message in footer bar	Jam or failure.	Write down the message and call Biolog Technical Services.
"Not at Temperature" error message in footer bar and "Not at Temp" light in front of instrument goes on	Set and actual temperature out of range (+/- 2°C)	If there is more than a 2°C difference between the temperature you set and the actual temperature of the incubator/reader, this message will appear. This message will appear whenever you reset the temperature and remain in place until the temperature range has been reached. The "Not at Temp" light at the front of the instrument will also illuminate until the temperature range has been reached.

Symptom	Cause	Solution
"Interrupt On" light at front of incubator / reader goes on.	You have tried to open the door while the camera assembly is moving.	Shut the door immediately. The incubator/reader will reset. To avoid making this error again, keep an eye on the footer bar for the message "Incubator/reader Moving." When this message shows, do NOT open the door.

13. System Verification

In this section:
- **➔Read Verification**
- **➔Checking the Error Logs**
- **➔Using Test Read**
- **➔Using Test Cycle**
- **➔ Field Service Tests**
- **➔ Relocating the OmniLog**

OmniLog ID has built-in utilities for testing the accuracy of readings and the functioning of the system. These utilities include:

Read Verification (is the incubator/reader working correctly?)

Error Logs (what exactly is happening when I get a hardware, video, temperature, or plate error message?)

Test Read (is the incubator/reader reading correctly for my uniquely altered MicroPlate?)

Test Cycle (are the hardware mechanical cycle process and associated video mechanics working correctly?)

Field Service tests (am I having a hardware error I cannot fix?)

Relocating the OmniLog (do I need to move the OmniLog to a different location?)

Read Verification

Please let us assist you in verifying the OmniLog System. Don't do this without the assistance of Biolog Technical Service help.

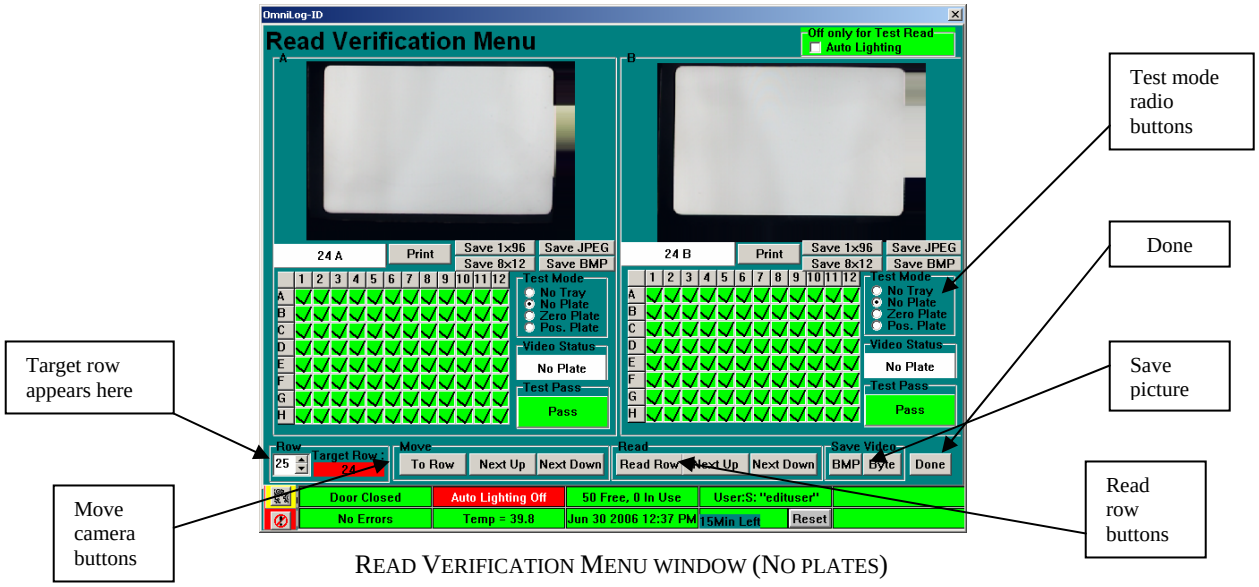
1. From the **Welcome** window, click **Reader Setup**. Make sure the com port is open, the reader is initialized, and the cycle mode is off.
2. Click **Read Verification** window appears, showing two MicroPlates.
3. Click on the checked box labeled **Auto Lighting** (right top corner of the screen). *The AutoLighting function must be off for system check Read Verification and Test Read. The Auto Lighing function must be turned on in all other cases for normal use.*
4. The **Read Verification** menu can check for four conditions:

   No tray

   No MicroPlates

   All zero value plate (Biolog's OmniLog Verification Kit is required for this test)

   All positive plate (Biolog's OmniLog Verification Kit is required for this test)
5. Select a row other than the one where the camera is parked.



READ VERIFICATION MENU WINDOW (NO PLATES)

Remember: Row 1 is at the bottom of the incubator /reader; row 25 is at the top.

*Note: The camera will normally park at the "home" position of row 25. The current parked location of the camera is listed in the lower right of the window ("Target Row"). Move the camera by scrolling the number in the box to the left of the target row up and down. Then click on **To Row** in the **Move** box. You can also move the camera one row up or down from the current row by clicking **Next Up** or **Next Down** in the **Move** box.*

6. Select the desired test. It is best to perform the same test for both MicroPlates in a row. For each of the two MicroPlates, click the desired item in **Test Mode**.

Note: You can change the test mode after a reading.

7. Place MicroPlates correctly, depending on the test you're running, as follows:

   For the "No Tray" test, remove the tray from the desired row

   For the "No Plate" test, have a tray with no MicroPlates in the desired row

   For the "All Zero Value Plate" and "All Positive Plate" tests, have all zero or all positive MicroPlates (as described in the OmniLog Verification Kit instructions) in the desired row and position

8. With the target row set to the correctly-loaded row, click **Read Row**. Wait until the footer bar says that the reader is idle again. The still video image of the two MicroPlates in that row will appear at the top of the window. The **Video Status** area will show

whether the camera detected a tray and MicroPlate. If you selected "No Tray" or "No Plate" test modes, a "pass" entry in **Test Pass** indicated a successful test. The display under the still video image will show a well-by-well pass/fail designation. If a well passes, it will contain a black check mark on a green background. If it fails, it will contain a black X on a red background. In the "All Zero" and "All Positive" tests, these designations will show for each well if that well was either zero (for the "All Zero" test) or positive (for the "All Positive" test). The **Test Pass** box will show "pass" only if all wells pass the test.

9. Change the target row and click **Read Row** to test other rows (you can also click **Next Up** or **Next Down**.
10. Perform all four tests to fully test the incubator/reader.
11. Click **Print** to print out a report of the Read Verification test for that MicroPlate.
12. Click **Save 1x96** or **Save 12x8** to save the actual data numbers for that MicroPlate to a comma delimited ASCII file. You will be prompted for the name of the file. The first entry in the ASCII file will be the file name (without the directory prefix). The rest of the file will contain the 96 data vales. The **1x96** selection will put all the data on one line. The **8x12** format will put the file name on the first line and the 96 data numbers in an 8-row/12-column format (as in a MicroPlate).
13. Click **Save Pic** to save the original (two MicroPlate) video image to the disk as a .bmp file. You will be prompted for a file name. Normally, you will only do this if Biolog Technical Services requests it in the event of a problem reading MicroPlates.
14. Click on the blank box labeled **Auto Lighting** (right top corner of the screen). *The Auto Lighting box will have a check mark and function is on and ready for normal operations.*
15. Click **Done** to return to **Reader Setup**.

Note: Contact Biolog Technical Support if any Read Verification tests fail.

Checking the Error Logs

At times, OmniLog ID may give you an error message. These messages will appear in the lower left-hand section of the footer bar. All errors encountered by the OmniLog are stored in a log file, which you can review. The footer bar will contain a message if any error logs contain errors. To clear these error messages, you must enter the appropriate error log and zero the file.

Note: Error messages appear in the footer bar according to a Hardware/Video/Temperature/Plate hierarchy. For instance, if there

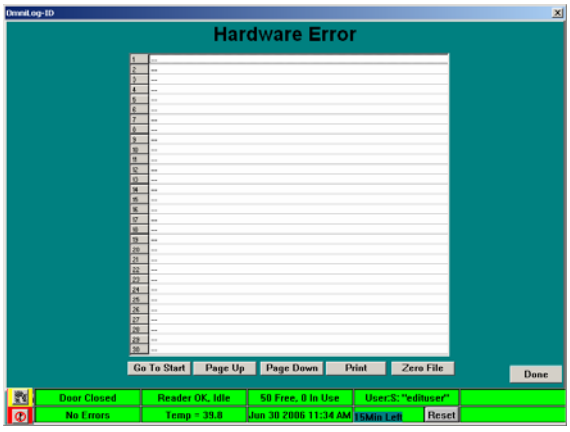
are current video and plate errors in the system, the footer bar will show only a "Video Error." Once you've cleared the cause of that error, the footer bar will show "Plate Error."

Table 13.1 shows the types of error message you might receive:

TABLE 13-1: ERROR MESSAGE TYPES

Error Type	Problem This Error Could Cause
Hardware	Incubator/reader may jam
Video	A problem reading a MicroPlate
Temperature	Incubating temperature may have spiked or dropped
Plate	Plate may be missing or left in the incubator/reader

1. From the **Welcome** window, click **Reader Setup**.
2. In the **Error Logs** area, click the error type you wish to view (as listed in the footer bar warning).



HARDWARE ERRORS WINDOW

3. You can view or manipulate the list as follows:

   Click **Go to Start** to see a description of the first error

   Click **Page Up** to see a description of the previous error

   Click **Page Down** to see a description of the next error

   Click **Print** to print the error list

   Click **Zero File** to delete the list (need Edit privilege)

4. Click **Done**. The software will return to the **Reader Setup** window.

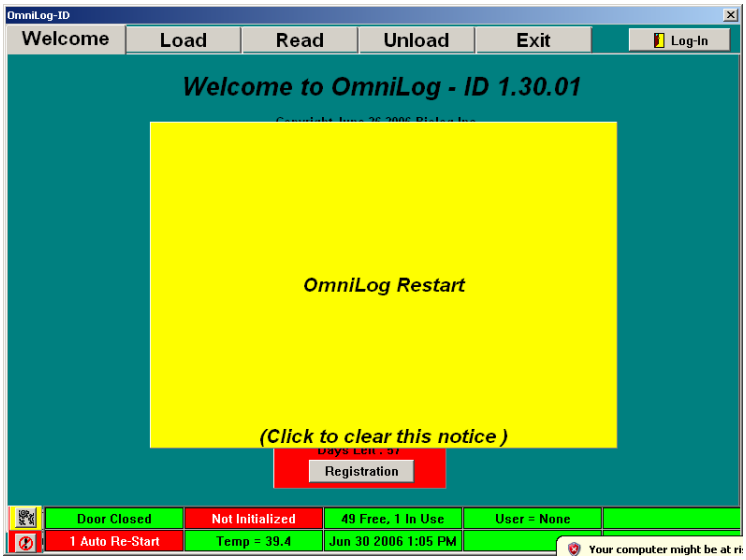
5. Click **Done**. The software will return to the **Welcome** window.

Additional Footer Bar Notices

Notice	Meaning
Restart Notice	Power was interrupted to the unit, Restart of Unit performed.
Service Warning	Contact Tech Services, unit may need routine preventative maintenance.

View and clear Notices by following steps 1-5 on page 13.4.

Clear Auto-Restart Notice



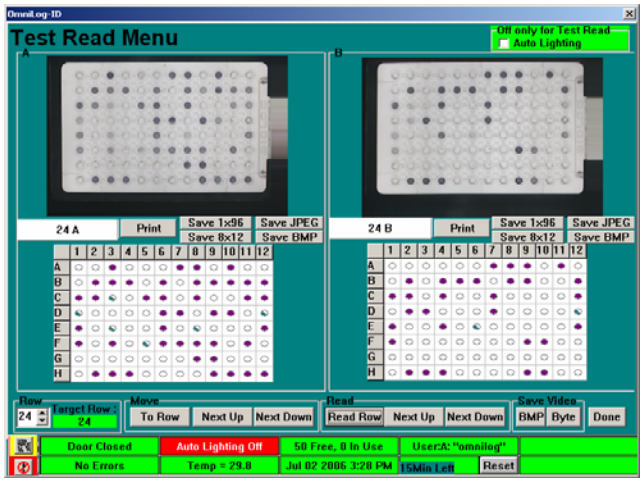
- This Restart Notice appears when an Auto-Restart happens and will appear only on the Welcome Menu, and must be cleared by clicking on it.
- You still will need to clear the Error Log.

Using Test Read

Please let us assist you in verifying the OmniLog System. Don't do this without the assistance of Biolog Technical Service help.

Test Read is a method of recording information for analysis to determine if the incubator/reader is reading correctly when using non-standard MicroPlates or conditions. *Don't perform this test without the help of Biolog Technical Service.*

1. From the **Welcome** window, click **Reader Setup**. Make sure the com port is open, the reader is initialized, and the cycle mode is off. Click **Test** Read Menu.



TEST READ WINDOW (2 PLATES)

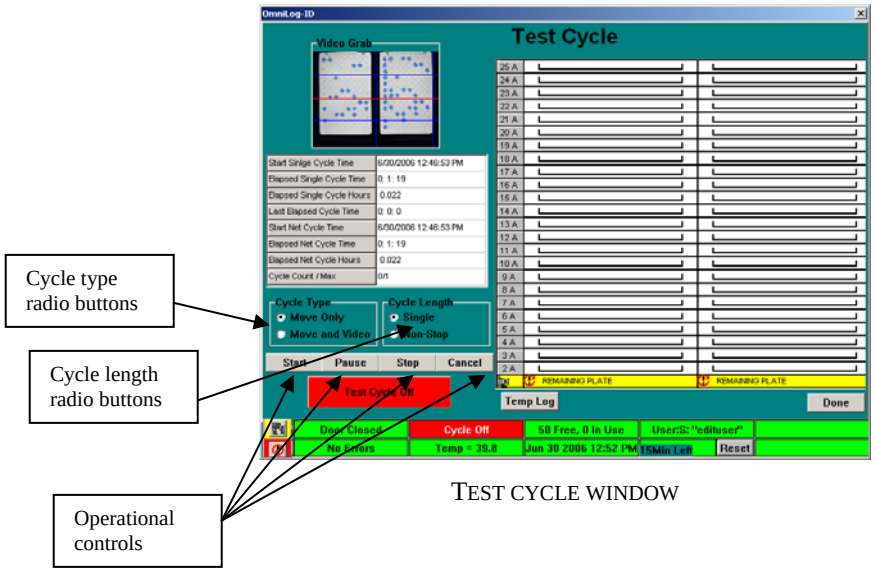
2. The **Test Read** window is similar to **Read Verification**. The only difference is that instead of reading the MicroPlates versus a test mode, the window displays the numeric values and positive/borderline/negative indicators of the MicroPlates. Use the buttons as described on pages 13.1-13.3.

Using Test Cycle

The Test Cycle is a method to test the hardware mechanical cycle process and associated video mechanics. You will only use this test to diagnose a hardware failure. *Don't perform this test without the help of Biolog Technical Service.*

1. From the **Welcome** menu, click **Reader** Setup. Make sure the com port is open, the incubator/reader is initialized, and the cycle mode is off.

2. Click **Test Cycle**. The **Test Cycle** window appears.



TEST CYCLE WINDOW

Please let us assist you in verifying the OmniLog System. Don't do this without the assistance of Biolog Technical Service help.

3. In the **Cycle Type** area of the window, select the **Move Only** radio button (to mechanically move the tray only) or the **Move and Video** radio button (mechanically move the tray cycle and capture the cycle on video).
4. In the **Cycle Length** area of the window, select the **Single Cycle** radio button (to perform a single cycle through all trays) or the **Non-Stop** radio button (to cycle repeatedly through all trays).
5. Click **Start** to begin the test cycle process.
6. If desired, click **Pause** to pause the cycle process.
7. Click **Stop** to stop the cycle process.
8. Click **Cancel** to cancel the cycle process (if you want to restart, you must reinitialize the reader).
9. Check **Status** to see if the test is cycling off or on.
10. Click **Done**. The software will return to the **Reader Setup** window.

Field Service Tests

On the **Welcome** window you'll see a yellow box in the lower half labeled "Field Service Only." The **Print Hardware Status** and **Save Hardware Status** buttons are password protected and are only to be used by an authorized Biolog Field Service Technician.

In the event of a hardware error, contact Biolog Technical Services.

We may ask you to repeat the error and click the New Button for Hardware Status Menu has been placed on the footer bar, upper left corner.

No normal customer use functional capabilities are on this screen. This is used only on the instruction of Biolog authorized Technical or Field

Service Representative to assist in trouble shooting customer problems.
This menu has been improved to contain more information for troubleshooting purposes.
Hardware Status Menu contains 4 tabs:

1. Hardware
2. Video
3. Data
4. Error Logs

At the bottom of each page are 4 buttons:

1. Close – To close the Hardware Status Menu
2. Save as JPEG – to save a JPEG image of the screen to e-mail to Biolog representative.
3. Save as BMP – to save a BMP image of the screen to e-mail to Biolog representative.
4. Print – to generate a printout of the screen.

Fax or e-mail the complete print-out to Biolog Technical Services.

The **Test Bell** button on the **Reader Setup** window will ring the system bell on the computer once. The bell will ring continuously during a door-open error. This button helps you make sure you can hear the bell.

Relocating the OmniLog

Caution**!**

Once the OmniLog ID system is set up, it's best NOT to move it. If for some reason you must move it, call Biolog Technical Services first, then follow these instructions.

If you physically move the OmniLog, you must first park the camera and make sure there's a tray in the bottom row, as follows:

1. On the **Welcome** window, click **Reader Setup**. Make sure the com port is open, the reader is initialized, and the cycle mode is off.
2. Move the camera to the top or bottom of the reader, using the **Move Camera** buttons. The normal resting position for the camera is row 25.
3. Before physically moving the incubator/reader, verify that an empty tray is in Row 1.

Note: It is standard practice to transport the reader with the camera at the top with a tray in the bottom row.

Click **Park**.

Wait until the footer bar Reader Status cell goes from **Busy** to **Idle**.

Quit the OmniLog software and turn off the OmniLog computer.

It is advisable (for weight considerations) to remove all other trays from the incubator/reader before transporting it. Remember to re-install all trays before using it again.

14. Glossary

In this section:
➔ **Definitions of Terms**

Aseptic technique Standard lab procedures used to prevent contamination.

Carbon source utilization Basic process used to identify microbes based on the chemicals they can utilize.

Catalase test Additional test used to characterize gram-positive bacteria.

Dendrogram Cluster diagram in the form of a branching tree.

Enteric Gram-negative bacteria belonging to the group *Enterobacteriaceae*.

Freeze The act of converting a datafile into a Frozen and non-editable format.

Gram negative Bacteria showing typical pink or red reaction on Gram stains.

Gram positive Bacteria show typical blue or violet reaction on Gram stains.

Histogram Visual representation of MicroPlate color distribution and thresholds.

Inocula Cell suspension used to inoculate MicroPlates.

Inoculating fluid Fluid used to prepare inocula.

Maltose A sugar added to BUG Agar. Required for culturing spore-forming gram-positive rods (e.g., *Bacillus* species).

MicroPlate Plate with 95 carbon source utilization tests (one in each well), with A1 well as control.

MicroPlate reactions Positive, negative, and borderline color responses used to identify microbes.

Non-enteric Gram-negative bacteria not belonging to the group *Enterobacteriaceae*.

Oxidase test Additional test used to characterize gram-negative bacteria.

Pattern Color responses in MicroPlates.

(i) **Pleomorphic** Having various distinct forms or shapes exhibited by a single strain or species

Progressive ID (PID) Biolog, Inc. developed pattern matching method which considers the progressive sequence in which purple wells are formed.

Pure culture Culture containing only one microbe species.

Restricted Access mode Mode set by system administrator to prevent unregistered users from using system; assign user names, passwords and privileges to each user; create an audit trail, and freeze data files to maintain data integrity.

Salicylate Anticapsulate agent required as an addition to inoculating fluid for a few gram-positive species.

Thioglycolate Anticapsulate agent required as an addition to inoculating fluid for gram-negative enteric bacteria, gram-negative fastidious bacteria, and gram-positive cocci and rods.

Thresholds The optical boundaries between negative, borderline, and positive reactions.

TSI slant Additional test used to characterize gram-negative bacteria.

Turbidity Measurement of cloudiness, which is indicative of inocula cell densities.

Unrestricted Access mode Mode set by system administrator to allow any user to use all OmniLog software functions.

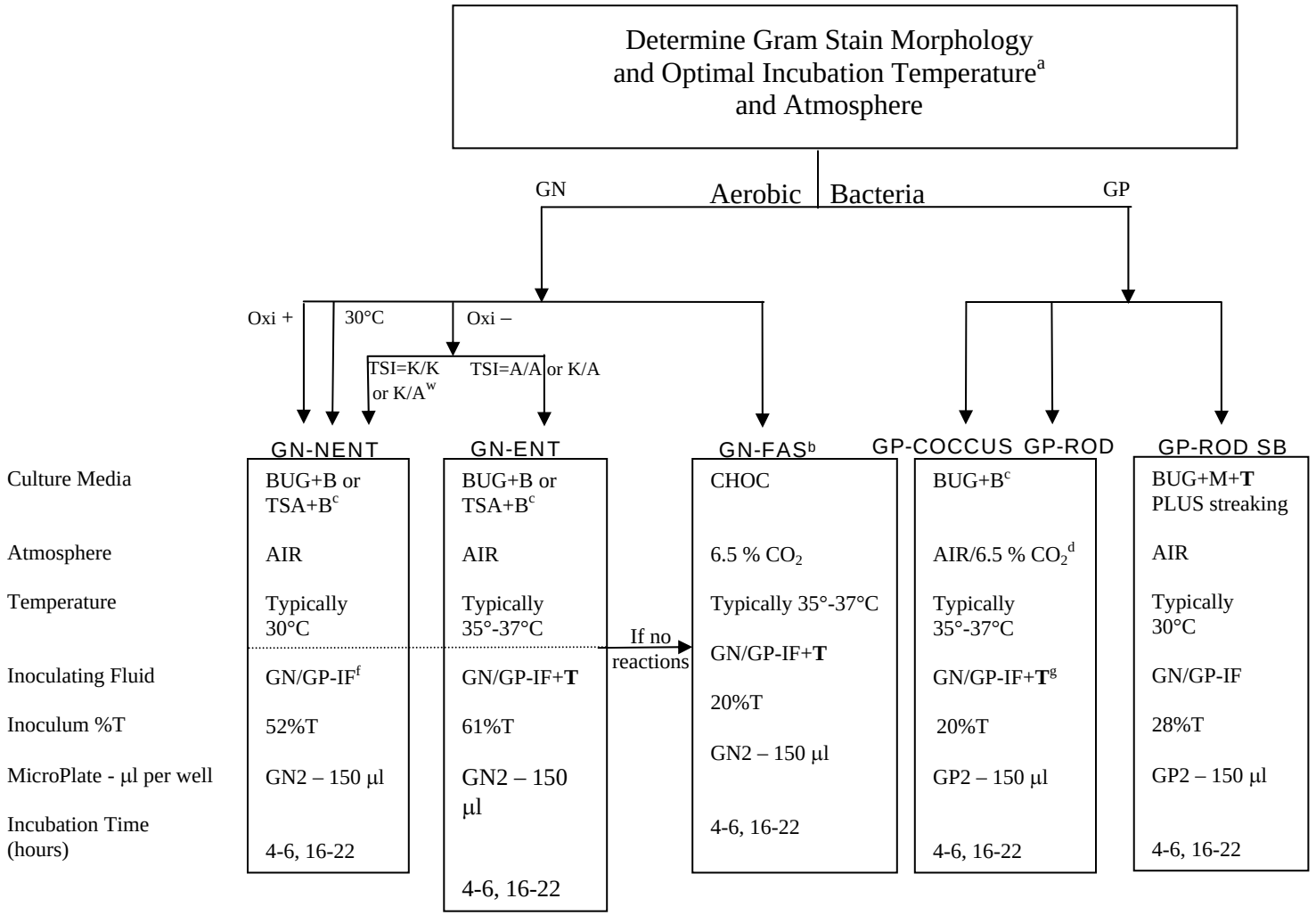
User Database Database produced by the User, developed by using edited User datafiles to designate the reaction patterns of organism group clusters for specialized identification purposes. (Use RetroSpect Trending and Tracking Software)

15. Appendices

In this section:

- **Setup Flowchart**
- **OmniLog Sample Worksheet**
- **Database Species Lists and Their Characteristics**
- **Program ID Printout**
- **Using the Dangerous Pathogen Database**

Appendix 1: Release 1.1 Setup Flowchart



[a] With the exception of thermophiles, all species are either 26°C, 30° or 35°-37°C.
[b] Requiring CHOC or CO_2 for growth or forming <1 mm colonies on BUG+B.
[c] Agricultural species may be grown on BUG without blood.
[d] Air, unless organism requires CO_2 for growth.
[e] If control well (A1) is positive, add thioglycolate to inoculating fluid.
[f] If control well (A1) is positive, add salicylate along with thioglycolate to inoculating fluid.

ABBREVIATIONS
Oxi = Oxidase; TSI = Triple Sugar Iron Slant; A = Acid, A^W = Weak Acid, K = Alkaline

Appendix 2: OmniLog Sample Worksheet

Tray #	Plate Type	Strain Type	Sample #	Name	Number	Other
__A						
__B						
__A						
__B						
__A						
__B						
__A						
__B						
__A						
__B						

† Agricultural bacteria that maybe grown on Bug without load.
** Found n the Dangerous Pathogen database

Appendix 3: Database Species Lists and Their Characteristics

Gram-Negative Aerobic Bacteria

	Species Name	Type	Test	Thio	Medium	Atm	Temp
1	**"Achromobacter cholinophagum"**	GN-NENT	O+	N	BUG+B	Air	30
2	**Achromobacter xylosoxidans ss denitrificans**	GN-NENT	O+	N	BUG+B	Air	30
3	**Achromobacter xylosoxydans ss xylosoxidans**	GN-NENT	O+	N	BUG+B	Air	30
4	**Acidovorax avenae ss avenae**	GN-NENT	O+	N	BUG+B†	Air	30
5	**Acidovorax avenae ss cattleyae**	GN-NENT	O+	N	BUG+B†	Air	30
6	**Acidovorax avenae ss citruli**	GN-NENT	O+	N	BUG+B†	Air	30
7	**Acidovorax delafieldii**	GN-NENT	O+	N	BUG+B†	Air	30
8	**Acidovorax facilis**	GN-NENT	O+	N	BUG+B†	Air	30
9	**Acidovorax konjaci**	GN-NENT	O+	N	BUG+B†	Air	30
10	**Acidovorax temperans**	GN-NENT	O+	N	BUG+B†	Air	30
11	**Acinetobacter baumanii/genospecies 2**	GN-NENT	O-	N	BUG+B	Air	30
12	**Acinetobacter calcoaceticus bv alc**	GN-NENT	O-	N	BUG+B	Air	30
13	**Acinetobacter calcoaceticus/genospecies 1**	GN-NENT	O-	N	BUG+B	Air	30
14	**Acinetobacter calcoaceticus/genospecies 3**	GN-NENT	O-	N	BUG+B	Air	30
15	**Acinetobacter calcoaceticus/genospecies 13**	GN-NENT	O-	N	BUG+B	Air	30
16	**Acinetobacter genospecies 6**	GN-NENT	O-	N	BUG+B	Air	30
17	**Acinetobacter genospecies 10**	GN-NENT	O-	N	BUG+B	Air	30
18	**Acinetobacter genospecies 11**	GN-NENT	O-	N	BUG+B	Air	30
19	**Acinetobacter genospecies 14**	GN-NENT	O-	N	BUG+B	Air	30
20	**Acinetobacter genospecies 15**	GN-NENT	O-	N	BUG+B	Air	30
21	**Acinetobacter haemolyticus/genospecies 4**	GN-NENT	O-	N	BUG+B	Air	30
22	**Acinetobacter johnsonii/genospecies 7**	GN-NENT	O-	N	BUG+B	Air	30
23	**Acinetobacter junii/genospecies 5**	GN-NENT	O-	N	BUG+B	Air	30
24	**Acinetobacter lwoffii/genospecies 8/9**	GN-NENT	O-	N	BUG+B	Air	30
25	**Acinetobacter radioresistens/genospecies 12**	GN-NENT	O-	N	BUG+B	Air	30
26	**Actinobacillus capsulatus**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
27	**Actinobacillus equuli**	GN-FAS	O+/-	Y	CHOC	6.5%CO2	35-37
28	**Actinobacillus hominis**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
29	**Actinobacillus indolicus**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
30	**Actinobacillus lignieresii**	GN-FAS	O+/-	Y	CHOC	6.5%CO2	35-37
31	**Actinobacillus minor**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
32	**Actinobacillus muris**	GN-FAS	O+/-	Y	CHOC	6.5%CO2	35-37
33	**Actinobacillus pleuropneumoniae**	GN-FAS	O+/-	Y	CHOC	6.5%CO2	35-37
34	**Actinobacillus porcinus**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
35	**Actinobacillus rossii**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
36	**Actinobacillus salpingitidis**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
37	**Actinobacillus seminis**	GN-FAS	O+/-	Y	CHOC	6.5%CO2	35-37
38	**Actinobacillus suis**	GN-FAS	O+/-	Y	CHOC	6.5%CO2	35-37
39	**Actinobacillus ureae**	GN-FAS	O+/-	Y	CHOC	6.5%CO2	35-37
40	**Aeromonas allosaccharophila**	GN-NENT	O+	N	BUG+B	Air	30
41	**Aeromonas caviae DNA group 4**	GN-NENT	O+	N	BUG+B	Air	30
42	**Aeromonas encheleia**	GN-NENT	O+	N	BUG+B	Air	30
43	**Aeromonas enteropelogenes**	GN-NENT	O+	N	BUG+B	Air	30
44	**Aeromonas eucrenophila DNA group 6**	GN-NENT	O+	N	BUG+B	Air	30
45	**Aeromonas hydrophila DNA group 1**	GN-NENT	O+	N	BUG+B	Air	30
46	**Aeromonas hydrophila-like DNA group 2**	GN-NENT	O+	N	BUG+B	Air	30
47	**Aeromonas hydrophila-like DNA group 3**	GN-NENT	O+	N	BUG+B	Air	30
48	**Aeromonas ichthiosmia**	GN-NENT	O+	N	BUG+B	Air	30
49	**Aeromonas jandaei DNA group 9**	GN-NENT	O+	N	BUG+B	Air	30
50	**Aeromonas media DNA group 5b**	GN-NENT	O+	N	BUG+B	Air	30
51	**Aeromonas media-like DNA group 5a**	GN-NENT	O+	N	BUG+B	Air	30
52	**Aeromonas salmonicida ss achromogenes**	GN-NENT	O+	N	BUG+B	Air	30
53	**Aeromonas salmonicida ss masoucida**	GN-NENT	O+	N	BUG+B	Air	30
54	**Aeromonas salmonicida ss salmonicida**	GN-NENT	O+	N	BUG+B	Air	30

† Agricultural bacteria that maybe grown on Bug without load.
** Found n the Dangerous Pathogen database

Appendix 3: Database Species Lists and Their Characteristics

	Species Name	Type	Test	Thio	Medium	Atm	Temp
55	**Aeromonas schubertii DNA group 12**	GN-NENT	O+	N	BUG+B	Air	30
56	**Aeromonas sobria DNA group 7**	GN-NENT	O+	N	BUG+B	Air	30
57	**Aeromonas trota DNA group 13**	GN-NENT	O+	N	BUG+B	Air	30
58	**Aeromonas veronii DNA group 10**	GN-NENT	O+	N	BUG+B	Air	30
59	**Aeromonas veronii/sobria DNA group 8**	GN-NENT	O+	N	BUG+B	Air	30
60	**Alcaligenes faecalis ss faecalis**	GN-NENT	O+	N	BUG+B	Air	30
61	**Alysiella filiformis**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
62	**Aminobacter aminovorans**	GN-NENT	O+	N	BUG+B	Air	30
63	**Ancylobacter aquaticus**	GN-NENT	O+	N	BUG+B	Air	30
64	**Aquaspirillum autotrophicum**	GN-NENT	O+	N	BUG+B	Air	30
65	**Aquaspirillum dispar**	GN-NENT	O+	N	BUG+B	Air	30
66	**Aquaspirillum metamorphum**	GN-NENT	O+	N	BUG+B	Air	30
67	**Aquaspirillum peregrinum ss integrum**	GN-NENT	O+	N	BUG+B	Air	30
68	**Aquaspirillum peregrinum ss peregrinum**	GN-NENT	O+	N	BUG+B	Air	30
69	**Aquaspirillum putridiconchylium**	GN-NENT	O+	N	BUG+B	Air	30
70	**Bergeyella zoohelcum**	GN-NENT	O+	N	BUG+B	Air	30
71	**Bordetella avium**	GN-NENT	O+	N	BUG+B	Air	35-37
72	**Bordetella bronchiseptica**	GN-NENT	O+	N	BUG+B	Air	35-37
73	**Bordetella hinzii**	GN-NENT	O+	N	BUG+B	Air	30
74	**Bordetella holmesii**	GN-NENT	O-	N	BUG+B	Air	30
75	**Bordetella parapertussis**	GN-NENT	O-	N	BUG+B	Air	35-37
76	**Bordetella pertussis**	GN-NENT	O+	N	BUG+B	Air	35-37
77	**Bordetella trematum**	GN-NENT	O-	N	BUG+B	Air	30
78	**Bordetella-like species**	GN-NENT	O+	N	BUG+B	Air	35-37
79	**Brenneria rubrifaciens**	GN-ENT	O-	N	BUG+B†	Air	30
80	**Brenneria salicis**	GN-ENT	O-	N	BUG+B†	Air	30
81	**Brevundimonas diminuta**	GN-NENT	O+	N	BUG+B	Air	30
82	**Brevundimonas vesicularis**	GN-NENT	O+/-	N	BUG+B	Air	30
83	**Brucella melitensis (abortus)**	GN-FAS	O+	N	CHOC**	6.5%CO2	35-37
84	**Brucella melitensis (abortus, melitensis)**	GN-FAS	O+	N	CHOC**	6.5%CO2	35-37
85	**Brucella melitensis (melitensis)**	GN-FAS	O+	N	CHOC**	6.5%CO2	35-37
86	**Brucella melitensis (suis, canis)**	GN-FAS	O+	N	CHOC**	6.5%CO2	35-37
87	**Brucella melitensis (suis)**	GN-FAS	O+	N	CHOC**	6.5%CO2	35-37
88	**Budvicia aquatica**	GN-ENT	O-	Y	BUG+B	Air	35-37
89	**Burkholderia andropogonis**	GN-NENT	O+/-	N	BUG+B†	Air	30
90	**Burkholderia caryophylli**	GN-NENT	O+	N	BUG+B†	Air	30
91	**Burkholderia cepacia**	GN-NENT	O+/-	N	BUG+B†	Air	30
92	**Burkholderia gladioli**	GN-NENT	O+/-	N	BUG+B†	Air	30
93	**Burkholderia glathei**	GN-NENT	O+	N	BUG+B†	Air	30
94	**Burkholderia glumae**	GN-NENT	O+	N	BUG+B†	Air	30
95	**Burkholderia mallei**	GN-NENT	O+/-	N	BUG+B†**	Air	30
96	**Burkholderia multivorans**	GN-NENT	O+	N	BUG+B†	Air	30
97	**Burkholderia phenazinium**	GN-NENT	O+	N	BUG+B†	Air	30
98	**Burkholderia plantarii**	GN-NENT	O+	N	BUG+B†	Air	30
99	**Burkholderia pseudomallei**	GN-NENT	O+	N	BUG+B†**	Air	30
100	**Burkholderia pyrrocinia**	GN-NENT	O-	N	BUG+B†	Air	30
101	**Burkholderia vietnamiensis**	GN-NENT	O+	N	BUG+B†	Air	30
102	**Buttiauxella agrestis**	GN-ENT	O-	Y	BUG+B	Air	35-37
103	**Buttiauxella brennerae**	GN-ENT	O-	Y	BUG+B	Air	35-37
104	**Buttiauxella ferragutiae**	GN-ENT	O-	Y	BUG+B	Air	35-37
105	**Buttiauxella gaviniae**	GN-ENT	O-	Y	BUG+B	Air	35-37
106	**Buttiauxella izardii**	GN-ENT	O-	Y	BUG+B	Air	35-37
107	**Buttiauxella noackiae**	GN-ENT	O-	Y	BUG+B	Air	35-37
108	**Buttiauxella warmboldiae**	GN-ENT	O-	Y	BUG+B	Air	35-37
109	**Capnocytophaga canimorsus**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
110	**Capnocytophaga cynodegmi**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
111	**Capnocytophaga gingivalis**	GN-FAS	O-	Y	CHOC	6.5%CO2	35-37
112	**Capnocytophaga granulosa**	GN-FAS	O-	Y	CHOC	6.5%CO2	35-37
113	**Capnocytophaga haemolytica**	GN-FAS	O-	Y	CHOC	6.5%CO2	35-37
114	**Capnocytophaga ochracea/sputigena**	GN-FAS	O-	Y	CHOC	6.5%CO2	35-37
115	**Cardiobacterium hominis**	GN-NENT	O+	N	BUG+B	Air	35-37
116	**CDC group DF-3 (Capnocytophaga)**	GN-FAS	O-	Y	CHOC	6.5%CO2	35-37
117	**CDC group EF-4 (Neisseria)**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
118	**CDC group EO-2**	GN-NENT	O+	N	BUG+B	Air	30
119	**CDC group II-E subgroup A**	GN-NENT	O+	N	BUG+B	Air	30
120	**CDC group II-E subgroup B**	GN-NENT	O+	N	BUG+B	Air	30

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	Species Name	Type	Test	Thio	Medium	Atm	Temp
121	**CDC group II-H**	GN-NENT	O+	N	BUG+B	Air	30
122	**Cedecea davisae**	GN-ENT	O-	Y	BUG+B	Air	35-37
123	**Cedecea lapagei**	GN-ENT	O-	Y	BUG+B	Air	35-37
124	**Cedecea neteri**	GN-ENT	O-	Y	BUG+B	Air	35-37
125	**Chromobacterium violaceum**	GN-NENT	O+/-	N	BUG+B	Air	30
126	**Chryseobacterium balustinum**	GN-NENT	O+	Y	BUG+B	Air	30
127	**Chryseobacterium gleum /indologenes**	GN-NENT	O+	Y	BUG+B	Air	30
128	**Chryseobacterium indoltheticum**	GN-NENT	O+	Y	BUG+B	Air	30
129	**Chryseobacterium meningosepticum**	GN-NENT	O+	N	BUG+B	Air	30
130	**Chryseobacterium scophthalmum**	GN-NENT	O+	N	BUG+B	Air	30
131	**Chryseomonas luteola**	GN-NENT	O-	N	BUG+B	Air	30
132	**Citrobacter amalonaticus**	GN-ENT	O-	Y	BUG+B	Air	35-37
133	**Citrobacter braakii**	GN-ENT	O-	Y	BUG+B	Air	35-37
134	**Citrobacter farmeri**	GN-ENT	O-	Y	BUG+B	Air	35-37
135	**Citrobacter freundii**	GN-ENT	O-	Y	BUG+B	Air	35-37
136	**Citrobacter gillenii**	GN-ENT	O-	Y	BUG+B	Air	35-37
137	**Citrobacter koseri**	GN-ENT	O-	Y	BUG+B	Air	35-37
138	**Citrobacter murliniae**	GN-ENT	O-	Y	BUG+B	Air	35-37
139	**Citrobacter rodentium**	GN-ENT	O-	Y	BUG+B	Air	35-37
140	**Citrobacter sedlakii**	GN-ENT	O-	Y	BUG+B	Air	35-37
141	**Citrobacter werkmanii**	GN-ENT	O-	Y	BUG+B	Air	35-37
142	**Citrobacter youngae**	GN-ENT	O-	Y	BUG+B	Air	35-37
143	**Comamonas terrigena**	GN-NENT	O+	N	BUG+B†	Air	30
144	**Comamonas testosteroni**	GN-NENT	O+	N	BUG+B†	Air	30
145	**Cytophaga fermentans**	GN-NENT	O-	N	BUG+B	Air	30
146	**Delftia acidovorans**	GN-NENT	O+	N	BUG+B†	Air	30
147	**Edwardsiella hoshinae**	GN-ENT	O-	Y	BUG+B	Air	35-37
148	**Edwardsiella ictaluri**	GN-ENT	O-	N	BUG+B	Air	30
149	**Edwardsiella tarda**	GN-ENT	O-	Y	BUG+B	Air	35-37
150	**Eikenella corrodens**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
151	**Empedobacter brevis**	GN-NENT	O+	N	BUG+B	Air	30
152	**Enterobacter aerogenes (Klebsiella mobilis)**	GN-ENT	O-	Y	BUG+B	Air	35-37
153	**"Enterobacter agglomerans" bgp 2**	GN-ENT	O-	Y	BUG+B	Air	35-37
154	**"Enterobacter agglomerans" bgp 3**	GN-ENT	O-	Y	BUG+B	Air	35-37
155	**"Enterobacter agglomerans" bgp 4 (Pantoea)**	GN-ENT	O-	Y	BUG+B	Air	35-37
156	**"Enterobacter agglomerans" bgp 5**	GN-ENT	O-	Y	BUG+B	Air	35-37
157	**"Enterobacter agglomerans" bgp 6 (Pectobacterium)**	GN-ENT	O-	Y	BUG+B	Air	35-37
158	**"Enterobacter agglomerans" bgp 7 (Pantoea)**	GN-ENT	O-	Y	BUG+B	Air	35-37
159	**Enterobacter amnigenus**	GN-ENT	O-	Y	BUG+B	Air	35-37
160	**Enterobacter asburiae**	GN-ENT	O-	Y	BUG+B	Air	35-37
161	**Enterobacter cancerogenus**	GN-ENT	O-	Y	BUG+B	Air	35-37
162	**Enterobacter cloacae**	GN-ENT	O-	Y	BUG+B	Air	35-37
163	**Enterobacter gergoviae**	GN-ENT	O-	Y	BUG+B	Air	35-37
164	**Enterobacter hormaechei**	GN-ENT	O-	Y	BUG+B	Air	35-37
165	**Enterobacter intermedius**	GN-ENT	O-	Y	BUG+B	Air	35-37
166	**Enterobacter nimipressuralis**	GN-ENT	O-	Y	BUG+B	Air	35-37
167	**Enterobacter sakazakii**	GN-ENT	O-	Y	BUG+B	Air	35-37
168	**Erwinia amylovora**	GN-ENT	O-	N	BUG+B†	Air	30
169	**Escherichia blattae**	GN-ENT	O-	Y	BUG+B	Air	35-37
170	**Escherichia coli**	GN-ENT	O-	Y	BUG+B	Air	35-37
171	**Escherichia coli (USP5-7085)**	GN-ENT	O-	Y	BUG+B	Air	35-37
172	**Escherichia coli inactive**	GN-ENT	O-	Y	BUG+B	Air	35-37
173	**Escherichia coli O157:H7**	GN-ENT	O-	Y	BUG+B	Air	35-37
174	**Escherichia fergusonii**	GN-ENT	O-	Y	BUG+B	Air	35-37
175	**Escherichia hermannii**	GN-ENT	O-	Y	BUG+B	Air	35-37
176	**Escherichia vulneris**	GN-ENT	O-	Y	BUG+B	Air	35-37
177	**Ewingella americana**	GN-ENT	O-	Y	BUG+B	Air	35-37
178	**Flavimonas oryzihabitans**	GN-NENT	O-	N	BUG+B	Air	30
179	**Flavobacterium ferrugineum**	GN-NENT	O+	N	BUG+B	Air	30
180	**Flavobacterium flevense**	GN-NENT	O+	N	BUG+B	Air	30
181	**Flavobacterium hydatis**	GN-NENT	O+	N	BUG+B	Air	30
182	**Flavobacterium johnsoniae**	GN-NENT	O+	N	BUG+B	Air	30
183	**Flavobacterium mizutaii**	GN-NENT	O+	N	BUG+B	Air	30
184	**Flavobacterium mizutaii-like (CDC group II-I)**	GN-NENT	O+	N	BUG+B	Air	30
185	**Flavobacterium resinovorum**	GN-NENT	O+	N	BUG+B	Air	30
186	**"Flavobacterium tirrenicum" (Chryseobacterium)**	GN-NENT	O+	N	BUG+B	Air	30

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	Species Name	Type	Test	Thio	Medium	Atm	Temp
187	**Francisella philomiragia**	GN-FAS	O-/+	N	CHOC	6.5%CO2	35-37
188	**Francisella tularensis**	GN-FAS	O-	N	CHOC**	6.5%CO2	35-37
189	**Gilardi unnamed rod group 1**	GN-NENT	O+	N	BUG+B	Air	30
190	**Haemophilus actinomycetemcomitans**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
191	**Haemophilus aegyptius**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
192	**Haemophilus aphrophilus**	GN-FAS	O-	Y	CHOC	6.5%CO2	35-37
193	**Haemophilus avium (Pasteurella)**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
194	**Haemophilus ducreyi**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
195	**Haemophilus haemoglobinophilus**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
196	**Haemophilus haemolyticus**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
197	**Haemophilus influenzae**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
198	**Haemophilus paracuniculus**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
199	**Haemophilus paragallinarum**	GN-FAS	O-	Y	CHOC	6.5%CO2	35-37
200	**Haemophilus parahaemolyticus**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
201	**Haemophilus parainfluenzae**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
202	**Haemophilus paraphrohaemolyticus**	GN-FAS	O+/-	Y	CHOC	6.5%CO2	35-37
203	**Haemophilus paraphrophilus**	GN-FAS	O+/-	Y	CHOC	6.5%CO2	35-37
204	**Haemophilus parasuis**	GN-FAS	O-	Y	CHOC	6.5%CO2	35-37
205	**Haemophilus segnis**	GN-FAS	O-	Y	CHOC	6.5%CO2	35-37
206	**Haemophilus somnus**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
207	**Hafnia alvei**	GN-ENT	O-	Y	BUG+B	Air	35-37
208	**Herbaspirillum rubrisubalbicans**	GN-NENT	O+	N	BUG+B	Air	30
209	**Herbaspirillum seropedicae**	GN-NENT	O+	N	BUG+B	Air	30
210	**Hydrogenophaga flava**	GN-NENT	O+	N	BUG+B	Air	30
211	**Hydrogenophaga palleronii**	GN-NENT	O+	N	BUG+B	Air	30
212	**Hydrogenophaga pseudoflava**	GN-NENT	O+	N	BUG+B	Air	30
213	**Hydrogenophaga taeniospiralis**	GN-NENT	O+	N	BUG+B	Air	30
214	**Iodobacter fluviatilis**	GN-NENT	O+	N	BUG+B	Air	30
215	**Janthinobacterium lividum**	GN-NENT	O+/-	N	BUG+B	Air	26
216	**Kingella denitirificans**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
217	**Kingella kingae**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
218	**Kingella oralis**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
219	**Klebsiella oxytoca**	GN-ENT	O-	Y	BUG+B	Air	35-37
220	**Klebsiella pneumoniae ss ozaenae**	GN-ENT	O-	Y	BUG+B	Air	35-37
221	**Klebsiella pneumoniae ss pneumoniae**	GN-ENT	O-	Y	BUG+B	Air	35-37
222	**Klebsiella pneumoniae ss rhinoscleromatis**	GN-ENT	O-	Y	BUG+B	Air	35-37
223	**Kluyvera ascorbata**	GN-ENT	O-	Y	BUG+B	Air	35-37
224	**Kluyvera cochleae**	GN-ENT	O-	Y	BUG+B	Air	35-37
225	**Kluyvera cryocrescens**	GN-ENT	O-	Y	BUG+B	Air	35-37
226	**Kluyvera georgiana**	GN-ENT	O-	Y	BUG+B	Air	35-37
227	**Lampropedia hyalina**	GN-NENT	O+	N	BUG+B	Air	30
228	**Leclercia adecarboxylata**	GN-ENT	O-	Y	BUG+B	Air	35-37
229	**Leminorella grimontii**	GN-ENT	O-	Y	BUG+B	Air	35-37
230	**Leminorella richardii**	GN-ENT	O-	Y	BUG+B	Air	35-37
231	**Listonella anguillarum**	GN-NENT	O+	N	BUG+B	Air	30
232	**Listonella pelagia**	GN-NENT	O+	N	BUG+B	Air	30
233	**Mannheimia granulomatis**	GN-NENT	O+	N	BUG+B	Air	35-37
234	**Mannheimia haemolytica**	GN-NENT	O+	N	BUG+B	Air	35-37
235	**Moellerella wisconsensis**	GN-ENT	O-	Y	BUG+B	Air	35-37
236	**Moraxella bovis**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
237	**Moraxella canis**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
238	**Moraxella caprae**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
239	**Moraxella catarrhalis**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
240	**Moraxella caviae**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
241	**Moraxella cuniculi**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
242	**Moraxella equi**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
243	**Moraxella lacunata**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
244	**Moraxella nonliquefaciens**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
245	**Moraxella osloensis**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
246	**Moraxella ovis**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
247	**Morganella morganii ss morganii**	GN-ENT	O-	Y	BUG+B	Air	35-37
248	**Myroides odoratimimus**	GN-NENT	O+	N	BUG+B	Air	30
249	**Myroides odoratus**	GN-NENT	O+	N	BUG+B	Air	30
250	**Neisseria animalis**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
251	**Neisseria canis**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
252	**Neisseria cinerea**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37

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	Species Name	Type	Test	Thio	Medium	Atm	Temp
253	**Neisseria denitrificans**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
254	**Neisseria elongata ss elongata**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
255	**Neisseria flava**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
256	**Neisseria flavescens**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
257	**Neisseria gonorrhoeae**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
258	**Neisseria lactamica**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
259	**Neisseria meningitidis**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
260	**Neisseria mucosa**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
261	**Neisseria perflava**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
262	**Neisseria sicca**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
263	**Neisseria subflava**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
264	**Neisseria weaveri**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
265	**Obesumbacterium proteus**	GN-ENT	O-	Y	BUG+B	Air	35-37
266	**Obesumbacterium proteus biogroup 2**	GN-ENT	O-	Y	BUG+B	Air	35-37
267	**Oceanomonas doudoroffii**	GN-NENT	O+	N	BUG+B†	Air	30
268	**Ochrobactrum anthropi**	GN-NENT	O+	N	BUG+B	Air	30
269	**Oligella ureolytica**	GN-NENT	O+	N	BUG+B	Air	35-37
270	**Oligella urethralis**	GN-NENT	O+	N	BUG+B	Air	35-37
271	**Ornithobacterium rhinotracheale**	GN-NENT	O+	N	BUG+B	Air	30
272	**Pandoraea norimbergensis**	GN-NENT	O+	N	BUG+B†	Air	30
273	**Pantoea agglomerans**	GN-ENT	O-	Y	BUG+B	Air	35-37
274	**Pantoea citrea**	GN-ENT	O-	Y	BUG+B	Air	35-37
275	**Pantoea dispersa**	GN-ENT	O-	Y	BUG+B	Air	35-37
276	**Pantoea punctata**	GN-ENT	O-	Y	BUG+B	Air	35-37
277	**Pantoea stewartii ss stewartii**	GN-ENT	O-	Y	BUG+B	Air	35-37
278	**Pantoea terrea**	GN-ENT	O-	Y	BUG+B	Air	35-37
279	**"Pasteurella" aerogenes**	GN-NENT	O+/-	N	BUG+B	Air	35-37
280	**Pasteurella anatis**	GN-NENT	O+/-	N	BUG+B	Air	35-37
281	**Pasteurella bettyae**	GN-NENT	O-	N	BUG+B	Air	35-37
282	**Pasteurella caballi**	GN-NENT	O+	N	BUG+B	Air	35-37
283	**Pasteurella canis/stomatis**	GN-NENT	O+	N	BUG+B	Air	35-37
284	**Pasteurella dagmatis**	GN-NENT	O+	N	BUG+B	Air	35-37
285	**Pasteurella gallinarum**	GN-NENT	O+	N	BUG+B	Air	35-37
286	**Pasteurella langaaensis**	GN-NENT	O+/-	N	BUG+B	Air	35-37
287	**Pasteurella lymphangitidis**	GN-NENT	O-	N	BUG+B	Air	30
288	**Pasteurella mairii**	GN-NENT	O+	N	BUG+B	Air	30
289	**Pasteurella multocida ss multocida**	GN-NENT	O+	N	BUG+B	Air	35-37
290	**Pasteurella pneumotropica**	GN-NENT	O+	N	BUG+B	Air	35-37
291	**"Pasteurella" testudinis**	GN-NENT	O+	N	BUG+B	Air	30
292	**Pasteurella trehalosi**	GN-NENT	O+	N	BUG+B	Air	30
293	**Pasteurella volantium**	GN-NENT	O+	N	BUG+B	Air	35-37
294	**Paucimonas lemoignei**	GN-NENT	O+	N	BUG+B†	Air	30
295	**Pectobacterium carotovorum ss atrosepticum**	GN-ENT	O-	Y	BUG+B†	Air	35-37
296	**Pectobacterium carotovorum ss betavasculorum**	GN-ENT	O-	Y	BUG+B†	Air	35-37
297	**Pectobacterium carotovorum ss carotovorum**	GN-ENT	O-	Y	BUG+B†	Air	35-37
298	**Pectobacterium chrysanthemi**	GN-ENT	O-	Y	BUG+B†	Air	35-37
299	**Pectobacterium cypripedii**	GN-ENT	O-	Y	BUG+B†	Air	35-37
300	**Pedobacter heparinus**	GN-NENT	O+	N	BUG+B	Air	30
301	**Photobacterium angustum**	GN-NENT	O+	N	BUG+B	Air	30
302	**Photobacterium damsela ss damselae**	GN-NENT	O+	N	BUG+B	Air	30
303	**Photobacterium fischeri**	GN-NENT	O+	N	BUG+B	Air	30
304	**Photobacterium leiognathi**	GN-NENT	O+	N	BUG+B	Air	30
305	**Photorhabdus luminescens ss luminescens**	GN-ENT	O-	N	BUG+B	Air	30
306	**Phyllobacterium myrsinacearum**	GN-NENT	O+	N	BUG+B	Air	30
307	**Phyllobacterium rubiacearum**	GN-NENT	O+	N	BUG+B	Air	30
308	**Plesiomonas shigelloides**	GN-NENT	O+	N	BUG+B	Air	30
309	**Pragia fontium**	GN-ENT	O-	Y	BUG+B	Air	35-37
310	**Proteus mirabilis**	GN-ENT	O-	Y	BUG+B	Air	35-37
311	**Proteus myxofaciens**	GN-ENT	O-	Y	BUG+B	Air	35-37
312	**Proteus penneri/vulgaris**	GN-ENT	O-	Y	BUG+B	Air	35-37
313	**Providencia alcalifaciens**	GN-ENT	O-	Y	BUG+B	Air	35-37
314	**Providencia heimbachae**	GN-ENT	O-	Y	BUG+B	Air	35-37
315	**Providencia rettgeri**	GN-ENT	O-	Y	BUG+B	Air	35-37
316	**Providencia rustigianii**	GN-ENT	O-	Y	BUG+B	Air	35-37
317	**Providencia stuartii**	GN-ENT	O-	Y	BUG+B	Air	35-37
318	**Pseudomonas aeruginosa**	GN-NENT	O+	N	BUG+B†	Air	30

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319	**Pseudomonas agarici**	GN-NENT	O+	N	BUG+B†	Air	30
320	**Pseudomonas alcaligenes**	GN-NENT	O+/-	N	BUG+B†	Air	30
321	**Pseudomonas asplenii**	GN-NENT	O+	N	BUG+B†	Air	30
322	**Pseudomonas aurantiaca**	GN-NENT	O+	N	BUG+B†	Air	30
323	**"Pseudomonas bathycetes"**	GN-NENT	O+	N	BUG+B†	Air	30
324	**"Pseudomonas" boreopolis (Stenotrophomonas)**	GN-NENT	O+	N	BUG+B†	Air	30
325	**Pseudomonas caricapapayae (syringae)**	GN-NENT	O-	N	BUG+B†	Air	30
326	**Pseudomonas chlororaphis**	GN-NENT	O+	N	BUG+B†	Air	30
327	**Pseudomonas cichorii (syringae)**	GN-NENT	O-	N	BUG+B†	Air	30
328	**"Pseudomonas" cissicola (Xanthomonas-like)**	GN-NENT	O-	N	BUG+B†	Air	30
329	**Pseudomonas citronellolis**	GN-NENT	O+	N	BUG+B†	Air	30
330	**Pseudomonas corrugata**	GN-NENT	O+	N	BUG+B†	Air	30
331	**"Pseudomonas floridana" (Burkholderia-like)**	GN-NENT	O+	N	BUG+B†	Air	30
332	**Pseudomonas fluorescens**	GN-NENT	O+/-	N	BUG+B†	Air	30
333	**Pseudomonas fluorescens biotype A**	GN-NENT	O+/-	N	BUG+B†	Air	30
334	**Pseudomonas fluorescens biotype C**	GN-NENT	O+/-	N	BUG+B†	Air	30
335	**Pseudomonas fluorescens biotype F**	GN-NENT	O+/-	N	BUG+B†	Air	30
336	**Pseudomonas fluorescens biotype G**	GN-NENT	O+/-	N	BUG+B†	Air	30
337	**Pseudomonas fragi**	GN-NENT	O+	N	BUG+B†	Air	30
338	**Pseudomonas fulva**	GN-NENT	O+	N	BUG+B†	Air	30
339	**Pseudomonas fuscovaginae**	GN-NENT	O+	N	BUG+B†	Air	30
340	**"Pseudomonas group 2" (Burkholderia-like)**	GN-NENT	O+	N	BUG+B†	Air	30
341	**"Pseudomonas" huttiensis (Burkholderia-like)**	GN-NENT	O+	N	BUG+B†	Air	30
342	**Pseudomonas lundensis**	GN-NENT	O+	N	BUG+B†	Air	30
343	**Pseudomonas "maculicola"**	GN-NENT	O+	N	BUG+B†	Air	30
344	**Pseudomonas marginalis**	GN-NENT	O+	N	BUG+B†	Air	30
345	**Pseudomonas mendocina**	GN-NENT	O+	N	BUG+B†	Air	30
346	**"Pseudomonas mephitica"**	GN-NENT	O+	N	BUG+B†	Air	30
347	**Pseudomonas mucidolens**	GN-NENT	O+	N	BUG+B†	Air	30
348	**Pseudomonas nitroreducens/azelaica**	GN-NENT	O+	N	BUG+B†	Air	30
349	**Pseudomonas oleovorans**	GN-NENT	O+	N	BUG+B†	Air	30
350	**Pseudomonas pertucinogena**	GN-NENT	O+	N	BUG+B†	Air	30
351	**Pseudomonas pseudoalcaligenes ss pseudoalcaligenes**	GN-NENT	O+	N	BUG+B†	Air	30
352	**Pseudomonas putida**	GN-NENT	O+	N	BUG+B†	Air	30
353	**Pseudomonas putida biotype A**	GN-NENT	O+	N	BUG+B†	Air	30
354	**Pseudomonas putida biotype B**	GN-NENT	O+	N	BUG+B†	Air	30
355	**Pseudomonas resinovorans**	GN-NENT	O+	N	BUG+B†	Air	30
356	**Pseudomonas savastanoi pv fraxini**	GN-NENT	O-	N	BUG+B†	Air	30
357	**Pseudomonas savastanoi pv glycinea**	GN-NENT	O-	N	BUG+B†	Air	30
358	**Pseudomonas savastanoi pv nerii**	GN-NENT	O-	N	BUG+B†	Air	30
359	**Pseudomonas spinosa (Burkholderia)**	GN-NENT	O+	N	BUG+B†	Air	30
360	**Pseudomonas straminea**	GN-NENT	O+	N	BUG+B†	Air	30
361	**Pseudomonas stutzeri**	GN-NENT	O+	N	BUG+B†	Air	30
362	**Pseudomonas synxantha**	GN-NENT	O+	N	BUG+B†	Air	30
363	**Pseudomonas syringae pv aceris**	GN-NENT	O-	N	BUG+B†	Air	30
364	**Pseudomonas syringae pv antirrhini**	GN-NENT	O-	N	BUG+B†	Air	30
365	**Pseudomonas syringae pv apii**	GN-NENT	O-	N	BUG+B†	Air	30
366	**Pseudomonas syringae pv aptata**	GN-NENT	O-	N	BUG+B†	Air	30
367	**Pseudomonas syringae pv atrofaciens**	GN-NENT	O-	N	BUG+B†	Air	30
368	**Pseudomonas syringae pv coronafaciens**	GN-NENT	O-	N	BUG+B†	Air	30
369	**Pseudomonas syringae pv cunninghamiae**	GN-NENT	O-	N	BUG+B†	Air	30
370	**Pseudomonas syringae pv delphinii**	GN-NENT	O-	N	BUG+B†	Air	30
371	**Pseudomonas syringae pv eriobotryae**	GN-NENT	O-	N	BUG+B†	Air	30
372	**Pseudomonas syringae pv glycinea**	GN-NENT	O-	N	BUG+B†	Air	30
373	**Pseudomonas syringae pv helianthi**	GN-NENT	O-	N	BUG+B†	Air	30
374	**Pseudomonas syringae pv lachrymans**	GN-NENT	O-	N	BUG+B†	Air	30
375	**Pseudomonas syringae pv mori**	GN-NENT	O-	N	BUG+B†	Air	30
376	**Pseudomonas syringae pv myricae**	GN-NENT	O-	N	BUG+B†	Air	30
377	**Pseudomonas syringae pv oryzae**	GN-NENT	O-	N	BUG+B†	Air	30
378	**Pseudomonas syringae pv papulans**	GN-NENT	O-	N	BUG+B†	Air	30
379	**Pseudomonas syringae pv persicae**	GN-NENT	O-	N	BUG+B†	Air	30
380	**Pseudomonas syringae pv phaseolicola**	GN-NENT	O-	N	BUG+B†	Air	30
381	**Pseudomonas syringae pv pisi**	GN-NENT	O-	N	BUG+B†	Air	30
382	**Pseudomonas syringae pv porri**	GN-NENT	O-	N	BUG+B†	Air	30
383	**Pseudomonas syringae pv primulae**	GN-NENT	O-	N	BUG+B†	Air	30
384	**Pseudomonas syringae pv sesami**	GN-NENT	O-	N	BUG+B†	Air	30

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	Species Name	Type	Test	Thio	Medium	Atm	Temp
385	**Pseudomonas syringae pv syringae**	GN-NENT	O-	N	BUG+B†	Air	30
386	**Pseudomonas syringae pv tabaci A**	GN-NENT	O-	N	BUG+B†	Air	30
387	**Pseudomonas syringae pv tabaci B**	GN-NENT	O-	N	BUG+B†	Air	30
388	**Pseudomonas syringae pv tagetis**	GN-NENT	O-	N	BUG+B†	Air	30
389	**Pseudomonas syringae pv tomato**	GN-NENT	O-	N	BUG+B†	Air	30
390	**Pseudomonas syringae pv zinaniae**	GN-NENT	O-	N	BUG+B†	Air	30
391	**Pseudomonas taetrolens**	GN-NENT	O+	N	BUG+B†	Air	30
392	**Pseudomonas tolaasii**	GN-NENT	O+	N	BUG+B†	Air	30
393	**Pseudomonas viridiflava (syringae)**	GN-NENT	O-	N	BUG+B†	Air	30
394	**Pseudomonas viridilivida**	GN-NENT	O-	N	BUG+B†	Air	30
395	**Psychrobacter immobilis**	GN-NENT	O+	N	BUG+B	Air	30
396	**Psychrobacter phenylpyruvicus**	GN-NENT	O+	Y	BUG+B	Air	35-37
397	**Rahnella aquatilis**	GN-ENT	O-	Y	BUG+B	Air	35-37
398	**Ralstonia eutropha**	GN-NENT	O+	N	BUG+B	Air	30
399	**Ralstonia paucula**	GN-NENT	O+	N	BUG+B	Air	30
400	**Ralstonia pickettii**	GN-NENT	O+	N	BUG+B	Air	30
401	**Ralstonia solanacearum**	GN-NENT	O+	N	BUG+B	Air	30
402	**Raoultella planticola**	GN-ENT	O-	Y	BUG+B	Air	35-37
403	**Raoultella planticola/ornithinolytica**	GN-ENT	O-	Y	BUG+B	Air	35-37
404	**Raoultella terrigena**	GN-ENT	O-	Y	BUG+B	Air	35-37
405	**Rhizobium like-Cystic Fibrosis**	GN-NENT	O+	N	BUG+B†	Air	35-37
406	**Rhizobium radiobacter**	GN-NENT	O+/-	N	BUG+B†	Air	30
407	**Rhizobium rhizogenes**	GN-NENT	O+/-	N	BUG+B†	Air	30
408	**Rhizobium vitis**	GN-NENT	O+/-	N	BUG+B†	Air	30
409	**Riemerella anatipestifer**	GN-NENT	O+	N	BUG+B	Air	35-37
410	**Roseomonas cervicalis**	GN-NENT	O+	N	BUG+B	Air	30
411	**Roseomonas fauriae**	GN-NENT	O+	N	BUG+B	Air	30
412	**Roseomonas genomospecies 4**	GN-NENT	O+	N	BUG+B	Air	30
413	**Roseomonas genomospecies 5**	GN-NENT	O+	N	BUG+B	Air	30
414	**Roseomonas genomospecies 6**	GN-NENT	O+	N	BUG+B	Air	30
415	**Roseomonas gilardii**	GN-NENT	O+	N	BUG+B	Air	30
416	**Salmonella gp 1 (choleraesuis)**	GN-ENT	O-	Y	BUG+B	Air	35-37
417	**Salmonella gp 1 (choleraesuis) st choleraesuis**	GN-ENT	O-	Y	BUG+B	Air	35-37
418	**Salmonella gp 1 (choleraesuis) st gallinarum**	GN-ENT	O-	Y	BUG+B	Air	35-37
419	**Salmonella gp 1 (choleraesuis) st paratyphi A**	GN-ENT	O-	Y	BUG+B	Air	35-37
420	**Salmonella gp 1 (choleraesuis) st pullorum**	GN-ENT	O-	Y	BUG+B	Air	35-37
421	**Salmonella gp 1 (choleraesuis) st typhi**	GN-ENT	O-	Y	BUG+B	Air	35-37
422	**Salmonella gp 1 (choleraesuis) st typhimurium**	GN-ENT	O-	Y	BUG+B	Air	35-37
423	**Salmonella gp 3a (arizonae)**	GN-ENT	O-	Y	BUG+B	Air	35-37
424	**Salmonella gp 3b (diarizonae)**	GN-ENT	O-	Y	BUG+B	Air	35-37
425	**Salmonella gp 4 (houtenae)**	GN-ENT	O-	Y	BUG+B	Air	35-37
426	**Salmonella gp 5 (bongori)**	GN-ENT	O-	Y	BUG+B	Air	35-37
427	**Salmonella gp 6 (indica)**	GN-ENT	O-	Y	BUG+B	Air	35-37
428	**Serpens flexibilis**	GN-NENT	O+	N	BUG+B	Air	30
429	**Serratia entomophila**	GN-ENT	O-	Y	BUG+B	Air	35-37
430	**Serratia ficaria**	GN-ENT	O-/v	Y	BUG+B	Air	35-37
431	**Serratia fonticola**	GN-ENT	O-	Y	BUG+B	Air	35-37
432	**Serratia liquefaciens/grimesii**	GN-ENT	O-	Y	BUG+B	Air	35-37
433	**Serratia marcescens**	GN-ENT	O-	Y	BUG+B	Air	35-37
434	**Serratia odorifera**	GN-ENT	O-	Y	BUG+B	Air	35-37
435	**Serratia plymuthica**	GN-ENT	O-	Y	BUG+B	Air	35-37
436	**Serratia proteamaculans ss proteamaculans**	GN-ENT	O-	Y	BUG+B	Air	35-37
437	**Serratia rubidaea**	GN-ENT	O-	Y	BUG+B	Air	35-37
438	**Shewanella algae**	GN-NENT	O+	N	BUG+B	Air	30
439	**Shewanella putrefaciens A**	GN-NENT	O+	N	BUG+B	Air	30
440	**Shewanella putrefaciens B**	GN-NENT	O+	N	BUG+B	Air	30
441	**Shigella boydii**	GN-ENT	O-	Y	BUG+B	Air	35-37
442	**Shigella dysenteriae**	GN-ENT	O-	Y	BUG+B	Air	35-37
443	**Shigella flexneri**	GN-ENT	O-	Y	BUG+B	Air	35-37
444	**Shigella sonnei**	GN-ENT	O-	Y	BUG+B	Air	35-37
445	**Simonsiella crassa**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
446	**Simonsiella muelleri**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
447	**Simonsiella steedae**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
448	**Sinorhizobium meliloti**	GN-NENT	O+	N	BUG+B	Air	30
449	**Sphingobacterium multivorum**	GN-NENT	O+	N	BUG+B	Air	30
450	**Sphingobacterium multivorum-like**	GN-NENT	O+	N	BUG+B	Air	30

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	Species Name	Type	Test	Thio	Medium	Atm	Temp
451	**Sphingobacterium spiritovorum**	GN-NENT	O+	N	BUG+B	Air	30
452	**Sphingobacterium thalpophilum**	GN-NENT	O+	N	BUG+B	Air	30
453	**Sphingomonas adhaesiva**	GN-NENT	O+/-	N	BUG+B	Air	30
454	**Sphingomonas capsulata**	GN-NENT	O+/-	N	BUG+B	Air	30
455	**Sphingomonas echinoides**	GN-NENT	O+	N	BUG+B†	Air	30
456	**Sphingomonas macrogoltabidus**	GN-NENT	O+/-	N	BUG+B	Air	30
457	**Sphingomonas parapaucimobilis**	GN-NENT	O+/-	N	BUG+B	Air	30
458	**Sphingomonas paucimobilis A**	GN-NENT	O+/-	N	BUG+B	Air	30
459	**Sphingomonas paucimobilis B**	GN-NENT	O+/-	N	BUG+B	Air	30
460	**Sphingomonas sanguinis**	GN-NENT	O+/-	N	BUG+B	Air	30
461	**Sphingomonas terrae**	GN-NENT	O+/-	N	BUG+B	Air	30
462	**Sphingomonas yanoikuyae**	GN-NENT	O+/-	N	BUG+B	Air	30
463	**Stenotrophomonas maltophilia**	GN-NENT	O-	N	BUG+B†	Air	30
464	**Suttonella indologenes**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
465	**Tatumella ptyseos**	GN-ENT	O-	Y	BUG+B	Air	35-37
466	**Taylorella equigenitalis**	GN-FAS	O+	Y	CHOC	6.5%CO2	35-37
467	**Trabulsiella guamensis**	GN-ENT	O-	Y	BUG+B	Air	35-37
468	**Variovorax paradoxus**	GN-NENT	O+	N	BUG+B	Air	30
469	**Vibrio aestuarianus**	GN-NENT	O+	N	BUG+B	Air	30
470	**Vibrio alginolyticus**	GN-NENT	O+	N	BUG+B†	Air	30
471	**Vibrio campbelli**	GN-NENT	O+	N	BUG+B	Air	30
472	**Vibrio carchariae**	GN-NENT	O+	N	BUG+B	Air	30
473	**Vibrio cholerae (O1/ATCC 25870)**	GN-NENT	O+	N	BUG+B	Air	30
474	**Vibrio cholerae (O1/0139)**	GN-NENT	O+	N	BUG+B	Air	30
475	**Vibrio cholerae (non O1)**	GN-NENT	O+	N	BUG+B	Air	30
476	**Vibrio cincinnatiensis**	GN-NENT	O+	N	BUG+B	Air	30
477	**Vibrio diazotrophicus**	GN-NENT	O+	N	BUG+B	Air	30
478	**Vibrio fluvialis**	GN-NENT	O+	N	BUG+B	Air	30
479	**Vibrio furnissii**	GN-NENT	O+	N	BUG+B	Air	30
480	**Vibrio harveyi**	GN-NENT	O+	N	BUG+B	Air	30
481	**Vibrio mediterranei**	GN-NENT	O+	N	BUG+B	Air	30
482	**Vibrio metschnikovii**	GN-NENT	O-	N	BUG+B	Air	30
483	**Vibrio mimicus**	GN-NENT	O+	N	BUG+B	Air	30
484	**Vibrio natriegens**	GN-NENT	O+	N	BUG+B	Air	30
485	**Vibrio ordalii**	GN-NENT	O+	N	BUG+B	Air	30
486	**Vibrio parahaemolyticus**	GN-NENT	O+	N	BUG+B	Air	30
487	**Vibrio proteolyticus**	GN-NENT	O+	N	BUG+B	Air	30
488	**Vibrio splendidus**	GN-NENT	O+	N	BUG+B	Air	26
489	**Vibrio tubiashii**	GN-NENT	O+	N	BUG+B	Air	30
490	**Vibrio vulnificus**	GN-NENT	O+	N	BUG+B	Air	30
491	**Vogesella indigofera**	GN-NENT	O+	N	BUG+B	Air	30
492	**Weeksella virosa**	GN-NENT	O+	N	BUG+B	Air	30
493	**Xanthomonas albilineans**	GN-NENT	O-	N	BUG	Air	30
494	**Xanthomonas campestris pv begoniae A**	GN-NENT	O-	N	BUG	Air	30
495	**Xanthomonas campestris pv begoniae B**	GN-NENT	O-	N	BUG	Air	30
496	**Xanthomonas campestris pv campestris**	GN-NENT	O-	N	BUG	Air	30
497	**Xanthomonas campestris pv carotae**	GN-NENT	O-	N	BUG	Air	30
498	**Xanthomonas campestris pv corylina**	GN-NENT	O-	N	BUG	Air	30
499	**Xanthomonas campestris pv dieffenbachiae**	GN-NENT	O-	N	BUG	Air	30
500	**Xanthomonas campestris pv hyacinthi**	GN-NENT	O-	N	BUG	Air	30
501	**Xanthomonas campestris pv juglandis**	GN-NENT	O-	N	BUG	Air	30
502	**Xanthomonas campestris pv malvacearum**	GN-NENT	O-	N	BUG	Air	30
503	**Xanthomonas campestris pv nigromaculans**	GN-NENT	O-	N	BUG	Air	30
504	**Xanthomonas campestris pv pelargonii**	GN-NENT	O-	N	BUG	Air	30
505	**Xanthomonas campestris pv phaseoli**	GN-NENT	O-	N	BUG	Air	30
506	**Xanthomonas campestris pv poinsettiicola**	GN-NENT	O-	N	BUG	Air	30
507	**Xanthomonas campestris pv raphani**	GN-NENT	O-	N	BUG	Air	30
508	**Xanthomonas campestris pv sesami**	GN-NENT	O-	N	BUG	Air	30
509	**Xanthomonas campestris pv tardicrescens**	GN-NENT	O-	N	BUG	Air	30
510	**Xanthomonas campestris pv translucens**	GN-NENT	O-	N	BUG	Air	30
511	**Xanthomonas campestris pv vesicatoria**	GN-NENT	O-	N	BUG	Air	30
512	**Xanthomonas oryzae pv oryzicola**	GN-NENT	O-	N	BUG	Air	30
513	**Xenorhabdus bovienii**	GN-ENT	O-	N	BUG+B	Air	30
514	**Xenorhabdus nematophila**	GN-ENT	O-	N	BUG+B	Air	30
515	**Yersinia aldovae**	GN-ENT	O-	Y	BUG+B	Air	35-37
516	**Yersinia bercovieri**	GN-ENT	O-	Y	BUG+B	Air	35-37

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	Species Name	Type	Test	Thio	Medium	Atm	Temp
517	**Yersinia enterocolitica ss enterocolitica**	GN-ENT	O-	Y	BUG+B	Air	35-37
518	**Yersinia fredericksenii**	GN-ENT	O-	Y	BUG+B	Air	35-37
519	**Yersinia intermedia**	GN-ENT	O-	Y	BUG+B	Air	35-37
520	**Yersinia kristensenii**	GN-ENT	O-	Y	BUG+B	Air	35-37
521	**Yersinia mollaretii**	GN-ENT	O-	Y	BUG+B	Air	35-37
522	**Yersinia pestis**	GN-ENT	O-	Y	BUG+B**	Air	35-37
523	**Yersinia pseudotuberculosis**	GN-ENT	O-	Y	BUG+B	Air	35-37
524	**Yersinia rohdei**	GN-ENT	O-	Y	BUG+B	Air	35-37
525	**Yersinia ruckeri**	GN-ENT	O-	Y	BUG+B	Air	35-37
526	**Yokenella regensburgei**	GN-ENT	O-	Y	BUG+B	Air	35-37

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Gram-Positive Aerobic Bacteria

•	Species Name	Type	Test	Thio	Medium	Atm	Temp
1	**Actinomyces bovis**	GP-ROD	C-	Y	BUG+B	6.5%CO2	35-37
2	**Actinomyces canis**	GP-ROD	C+/-	Y	BUG+B	6.5%CO2	35-37
3	**Actinomyces hordeovulneris**	GP-ROD	C-	Y	BUG+B	6.5%CO2	35-37
4	**Actinomyces hyovaginalis**	GP-ROD	C-/W+	Y	BUG+B	6.5%CO2	35-37
5	**Actinomyces naeslundii**	GP-ROD	C-/W+	Y	BUG+B	6.5%CO2	35-37
6	**Actinomyces neuii ss anitratus**	GP-ROD	C+/-	Y	BUG+B	6.5%CO2	35-37
7	**Actinomyces neuii ss neuii**	GP-ROD	C+/-	Y	BUG+B	6.5%CO2	35-37
8	**Actinomyces odontolyticus**	GP-ROD	C-	Y	BUG+B	6.5%CO2	35-37
9	**Actinomyces radingae/turicensis (CDC.E)**	GP-ROD	C-	Y	BUG+B	6.5%CO2	35-37
10	**Actinomyces viscosus**	GP-ROD	C+	Y	BUG+B	6.5%CO2	35-37
11	**Aerococcus christensenii**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
12	**Aerococcus urinae**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
13	**Aerococcus viridans**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
14	**Alloiococcus otitis**	GP-COCCUS	C-/W+	Y	BUG+B	6.5%CO2	35-37
15	**Arcanobacterium bernardiae (CDC.2)**	GP-ROD	C-	Y	BUG+B	6.5%CO2	35-37
16	**Arcanobacterium haemolyticum**	GP-ROD	C-	Y	BUG+B	6.5%CO2	35-37
17	**Arcanobacterium pyogenes**	GP-ROD	C-	Y	BUG+B	6.5%CO2	35-37
18	**Arthrobacter cumminsii**	GP-ROD	C+	Y	BUG+B	Air	30
19	**Arthrobacter histidinolovorans**	GP-ROD	C+	Y	BUG+B	Air	30
20	**Arthrobacter ilicis**	GP-ROD	C+	Y	BUG+B	Air	30
21	**Arthrobacter woluwensis**	GP-ROD	C+	Y	BUG+B	Air	30
22	**Aureobacterium resistens**	GP-ROD	C+	Y	BUG+B	Air	35-37
23	**Bacillus alcalophilus**	GP-ROD SB	C-/W+	N	BUG+M	Air	30
24	**Bacillus amyloliquefaciens**	GP-ROD SB	C-/W+	N	BUG+M	Air	30
25	**Bacillus anthracis subgroup A**	GP-ROD SB	C-/W+	N	BUG+M	Air	30
26	**Bacillus anthracis subgroup B**	GP-ROD SB	C-/W+	N	BUG+M	Air	30
27	**Bacillus anthracis subgroup C**	GP-ROD SB	C-/W+	N	BUG+M	Air	30
28	**Bacillus anthracis subgroup D**	GP-ROD SB	C-/W+	N	BUG+M	Air	30
29	**Bacillus badius**	GP-ROD SB	C-/W+	N	BUG+M	Air	30
30	**Bacillus cereus/thuringiensis**	GP-ROD SB	C-/W+	N	BUG+M	Air	30
31	**Bacillus circulans**	GP-ROD SB	C-/W+	N	BUG+M	Air	30
32	**Bacillus coagulans**	GP-ROD SB	C-/W+	N	BUG+M	Air	30
33	**Bacillus fastidiosus**	GP-ROD SB	C-/W+	N	BUG+M	Air	30
34	**Bacillus firmus**	GP-ROD SB	C-/W+	N	BUG+M	Air	30
35	**Bacillus halodurans**	GP-ROD SB	C-/W+	N	BUG+M	Air	30
36	**Bacillus laevolacticus**	GP-ROD SB	C-/W+	N	BUG+M	Air	30
37	**Bacillus licheniformis**	GP-ROD SB	C-/W+	N	BUG+M	Air	30
38	**Bacillus maroccanus**	GP-ROD SB	C-/W+	N	BUG+M	Air	30
39	**Bacillus megaterium**	GP-ROD SB	C-/W+	N	BUG+M	Air	30
40	**Bacillus mycoides**	GP-ROD SB	C-/W+	N	BUG+M	Air	30
41	**Bacillus psychrosaccharolyticus**	GP-ROD SB	C-/W+	N	BUG+M	Air	30
42	**Bacillus pumilus**	GP-ROD SB	C-/W+	N	BUG+M	Air	30
43	**Bacillus racemilacticus**	GP-ROD SB	C-/W+	N	BUG+M	Air	30
44	**Bacillus sphaericus**	GP-ROD SB	C-/W+	N	BUG+M	Air	30
45	**Bacillus subtilis**	GP-ROD SB	C-/W+	N	BUG+M	Air	30
46	**Bacillus subtilis (ATCC 6633)**	GP-ROD SB	C-/W+	N	BUG+M	Air	30
47	**Brevibacillus brevis**	GP-ROD SB	C-/W+	N	BUG+M	Air	30
48	**Brevibacterium casei**	GP-ROD	C+	Y	BUG+B	Air	35-37
49	**Brevibacterium epidermidis**	GP-ROD	C+	Y	BUG+B	Air	35-37
50	**Brevibacterium linens**	GP-ROD	C+	Y	BUG+B	Air	35-37
51	**Brevibacterium liquifaciens**	GP-ROD	C+	Y	BUG+B	Air	35-37
52	**Brevibacterium mcbrellneri**	GP-ROD	C+	Y	BUG+B	Air	35-37
53	**Brevibacterium otitidis**	GP-ROD	C+	Y	BUG+B	Air	35-37
54	**Brochothrix campestris**	GP-ROD	C+	Y	BUG+B	6.5%CO2	35-37
55	**Brochothrix thermosphacta**	GP-ROD	C+	Y	BUG+B	Air	30
56	**Carnobacterium alterfunditum**	GP-ROD	C-	Y	BUG+B	Air	26
57	**Carnobacterium divergens**	GP-ROD	C-	Y	BUG+B	Air	26
58	**Carnobacterium gallinarum**	GP-ROD	C-	Y	BUG+B	Air	26
59	**Carnobacterium mobile**	GP-ROD	C-	Y	BUG+B	Air	26
60	**Carnobacterium piscicola**	GP-ROD	C-	Y	BUG+B	Air	26
61	**Cellolosimicrobium cellulans**	GP-ROD	C+	Y	BUG+B	Air	35-37
62	**Cellulomonas biazotea**	GP-ROD	C+	Y	BUG+B	Air	35-37

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	Species Name	Type	Test	Thio	Medium	Atm	Temp
63	**Cellulomonas cellasea**	GP-ROD	C+	Y	BUG+B	Air	30
64	**Cellulomonas fimi**	GP-ROD	C+	Y	BUG+B	Air	35-37
65	**Cellulomonas flavigena**	GP-ROD	C+	Y	BUG+B	Air	35-37
66	**Cellulomonas gelida**	GP-ROD	C+	Y	BUG+B	Air	35-37
67	**Cellulomonas hominis (CDC.A-3)**	GP-ROD	C+	Y	BUG+B	Air	35-37
68	**Cellulomonas turbata (Oerskovia turbata)**	GP-ROD	C+	Y	BUG+B	Air	35-37
69	**Cellulomonas uda**	GP-ROD	C+	Y	BUG+B	Air	35-37
70	**Clavibacter michiganensis ss insidiosus**	GP-ROD	C+	N	BUG	Air	30
71	**Clavibacter michiganensis ss michiganensis**	GP-ROD	C+	N	BUG	Air	30
72	**Clavibacter michiganensis ss nebraskensis**	GP-ROD	C+	N	BUG	Air	30
73	**Clavibacter michiganensis ss sepedonicus**	GP-ROD	C+	N	BUG	Air	30
74	**Clavibacter michiganensis ss tessellarius**	GP-ROD	C+	N	BUG	Air	30
75	**Corynebacterium accolens**	GP-ROD	C+	Y	BUG+B	Air	35-37
76	**Corynebacterium afermentans ss afermentans(CDC.ANF-1)**	GP-ROD	C+	Y	BUG+B	Air	35-37
77	**Corynebacterium afermentans ss lipophilum**	GP-ROD	C+	Y	BUG+B	Air	35-37
78	**"Corynebacterium" ammoniagenes (Brevibacterium-like)**	GP-ROD	C+	Y	BUG+B	Air	35-37
79	**Corynebacterium amycolatum (CDC.F-2)**	GP-ROD	C+	Y	BUG+B	Air	35-37
80	**Corynebacterium argentoratense**	GP-ROD	C+	Y	BUG+B	Air	35-37
81	**Corynebacterium auris**	GP-ROD	C+	Y	BUG+B	Air	35-37
82	**Corynebacterium bovis**	GP-ROD	C+	Y	BUG+B	Air	35-37
83	**Corynebacterium callunae**	GP-ROD	C+	Y	BUG+B	Air	35-37
84	**Corynebacterium camporrealensis**	GP-ROD	C+	Y	BUG+B	Air	35-37
85	**Corynebacterium coyleae**	GP-ROD	C+	Y	BUG+B	Air	35-37
86	**Corynebacterium cystitidis**	GP-ROD	C+	Y	BUG+B	Air	35-37
87	**Corynebacterium diphtheriae**	GP-ROD	C+	Y	BUG+B	Air	35-37
88	**Corynebacterium durum**	GP-ROD	C+	Y	BUG+B	Air	35-37
89	**Corynebacterium falsenii**	GP-ROD	C+	Y	BUG+B	Air	35-37
90	**Corynebacterium flavescens**	GP-ROD	C+	Y	BUG+B	Air	35-37
91	**Corynebacterium glucuronolyticum**	GP-ROD	C+	Y	BUG+B	Air	35-37
92	**Corynebacterium glutamicum**	GP-ROD	C+	Y	BUG+B	Air	35-37
93	**Corynebacterium imitans**	GP-ROD	C+	Y	BUG+B	Air	35-37
94	**Corynebacterium jeikeium**	GP-ROD	C+	Y	BUG+B	Air	35-37
95	**Corynebacterium kutscheri**	GP-ROD	C+	Y	BUG+B	Air	35-37
96	**Corynebacterium lipophiloflavum**	GP-ROD	C+	Y	BUG+B	Air	35-37
97	**Corynebacterium macginleyi**	GP-ROD	C+	Y	BUG+B	Air	35-37
98	**Corynebacterium mastitidis**	GP-ROD	C+	Y	BUG+B	Air	35-37
99	**Corynebacterium matruchotii**	GP-ROD	C+	Y	BUG+B	Air	35-37
100	**Corynebacterium minutissimum**	GP-ROD	C+	Y	BUG+B	Air	35-37
101	**Corynebacterium mucifaciens**	GP-ROD	C+	Y	BUG+B	Air	35-37
102	**Corynebacterium mycetoides**	GP-ROD	C+	Y	BUG+B	Air	35-37
103	**"Corynebacterium nitrilophilus"**	GP-ROD	C+	Y	BUG+B	Air	35-37
104	**Corynebacterium pilosum**	GP-ROD	C+	Y	BUG+B	Air	35-37
105	**Corynebacterium pseudodiphtheriticum/propinquum(CDC.ANF-3)**	GP-ROD	C+	Y	BUG+B	Air	35-37
106	**Corynebacterium pseudotuberculosis**	GP-ROD	C+	Y	BUG+B	Air	35-37
107	**Corynebacterium renale**	GP-ROD	C+	Y	BUG+B	Air	35-37
108	**Corynebacterium riegelii**	GP-ROD	C+	Y	BUG+B	Air	35-37
109	**Corynebacterium seminale**	GP-ROD	C+	Y	BUG+B	Air	35-37
110	**Corynebacterium singulare**	GP-ROD	C+	Y	BUG+B	Air	35-37
111	**Corynebacterium spp. (CDC.G)**	GP-ROD	C+	Y	BUG+B	Air	35-37
112	**Corynebacterium striatum (CDC.I-1)**	GP-ROD	C+	Y	BUG+B	Air	35-37
113	**Corynebacterium thomssenii**	GP-ROD	C+	Y	BUG+B	Air	35-37
114	**Corynebacterium ulcerans**	GP-ROD	C+	Y	BUG+B	6.5%CO2	35-37
115	**Corynebacterium urealyticum**	GP-ROD	C+	Y	BUG+B	Air	35-37
116	**Corynebacterium variabile (Caseobacter polymorphus)**	GP-ROD	C+	Y	BUG+B	Air	35-37
117	**Corynebacterium vitaeruminis**	GP-ROD	C+	Y	BUG+B	Air	35-37
118	**"Corynebacterium" xerosis (GPC)**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
119	**Curtobacterium albidum**	GP-ROD	C+	N	BUG	Air	30
120	**Curtobacterium citreum**	GP-ROD	C+	N	BUG	Air	30
121	**Curtobacterium flaccumfaciens**	GP-ROD	C+	N	BUG	Air	30
122	**Curtobacterium luteum**	GP-ROD	C+	N	BUG	Air	30
123	**Curtobacterium pusillum**	GP-ROD	C+	N	BUG	Air	30
124	**Deinococcus grandis**	GP-COCCUS	C+	Y	BUG+B	Air	30
125	**Deinococcus proteolyticus**	GP-COCCUS	C+	Y	BUG+B	Air	30
126	**Deinococcus radiodurans**	GP-COCCUS	C+	Y	BUG+B	Air	30
127	**Deinococcus radiophilus**	GP-COCCUS	C+	Y	BUG+B	Air	30
128	**Deinococcus radiopugnans**	GP-COCCUS	C+	Y	BUG+B	Air	35-37

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	Species Name	Type	Test	Thio	Medium	Atm	Temp
129	**Dermabacter hominis**	GP-ROD	C+	Y	BUG+B	Air	35-37
130	**Dermacoccus nishinomiyaensis**	GP-COCCUS	C+	Y	BUG+B	Air	30
131	**Dolosicoccus paucivorans**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
132	**Dolosigranulum pigrum**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
133	**Enterococcus avium**	GP-COCCUS	C-	Y	BUG+B	Air	35-37
134	**Enterococcus casseliflavus**	GP-COCCUS	C-	Y	BUG+B	Air	35-37
135	**Enterococcus cecorum**	GP-COCCUS	C-	Y	BUG+B	Air	35-37
136	**Enterococcus columbae**	GP-COCCUS	C-	Y	BUG+B	Air	35-37
137	**Enterococcus dispar**	GP-COCCUS	C-	Y	BUG+B	Air	30
138	**Enterococcus durans**	GP-COCCUS	C-	Y	BUG+B	Air	35-37
139	**Enterococcus faecalis**	GP-COCCUS	C-	Y	BUG+B	Air	35-37
140	**Enterococcus faecium**	GP-COCCUS	C-	Y	BUG+B	Air	35-37
141	**Enterococcus flavescens**	GP-COCCUS	C-	Y	BUG+B	Air	35-37
142	**Enterococcus gallinarum**	GP-COCCUS	C-	Y	BUG+B	Air	35-37
143	**Enterococcus hirae**	GP-COCCUS	C-	Y	BUG+B	Air	35-37
144	**Enterococcus malodoratus**	GP-COCCUS	C-	Y	BUG+B	Air	35-37
145	**Enterococcus mundtii**	GP-COCCUS	C-	Y	BUG+B	Air	35-37
146	**Enterococcus pseudoavium**	GP-COCCUS	C-	Y	BUG+B	Air	35-37
147	**Enterococcus raffinosus**	GP-COCCUS	C-	Y	BUG+B	Air	35-37
148	**Enterococcus saccharolyticus**	GP-COCCUS	C-	Y	BUG+B	Air	35-37
149	**Enterococcus solitarius**	GP-COCCUS	C-	Y	BUG+B	Air	35-37
150	**Enterococcus sulfureus**	GP-COCCUS	C-	Y	BUG+B	Air	35-37
151	**Eremococcus coleocola**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
152	**Erysipelothrix rhusiopathiae/tonsillarum**	GP-ROD	C-	Y	BUG+B	6.5%CO2	35-37
153	**Exiguobacterium acetylicum**	GP-ROD	C+	Y	BUG+B	Air	30
154	**Gardnerella vaginalis**	GP-ROD	C-	Y	BUG+B	6.5%CO2	35-37
155	**Gemella bergeri**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
156	**Gemella haemolysans/morbillorum**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
157	**Gemella palaticanis**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
158	**Gemella sanguinis**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
159	**Geobacillus stearothermophilus**	GP-ROD SB	C-/W+	N	BUG+M	Air	55
160	**Geobacillus thermoglucosidasius**	GP-ROD SB	C-/W+	N	BUG+M	Air	55
161	**Globicatella sanguinis**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
162	**Gordonia aichiensis**	GP-ROD	C+	Y	BUG+B	Air	35-37
163	**Gordonia bronchialis**	GP-ROD	C+	Y	BUG+B	Air	35-37
164	**Gordonia rubroprincta**	GP-ROD	C+	Y	BUG+B	Air	35-37
165	**Gordonia sputi**	GP-ROD	C+	Y	BUG+B	Air	35-37
166	**Gordonia terrae**	GP-ROD	C+	Y	BUG+B	Air	35-37
167	**Helcococcus kunzii**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
168	**Ignavigranum rouffiae**	GP-COCCUS	C+/-	Y	BUG+B	6.5%CO2	35-37
169	**Jonesia denitrificans**	GP-ROD	C+	Y	BUG+B	Air	35-37
170	**Kocuria kristinae**	GP-COCCUS	C+	Y	BUG+B	Air	30
171	**Kocuria rosea**	GP-COCCUS	C+	Y	BUG+B	Air	30
172	**Kocuria varians**	GP-COCCUS	C+	Y	BUG+B	Air	30
173	**Kurthia gibsonii**	GP-ROD	C+	Y	BUG+B	Air	30
174	**Kurthia sibirica**	GP-ROD	C+	Y	BUG+B	Air	30
175	**Kurthia zopfii**	GP-ROD	C+	Y	BUG+B	Air	35-37
176	**Kytococcus sedentarius**	GP-COCCUS	C+	Y	BUG+B	Air	30
177	**Lactococcus garvieae**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
178	**Lactococcus lactis ss cremoris**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
179	**Lactococcus lactis ss diacetylactis**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
180	**Lactococcus lactis ss hordniae**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
181	**Lactococcus lactis ss lactis**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
182	**Lactococcus plantarum**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
183	**Lactococcus raffinolactis**	GP-COCCUS	C-	Y	BUG+B	Air	30
184	**Leifsonia aquatica**	GP-ROD	C+	Y	BUG+B	Air	35-37
185	**Leuconostoc carnosum**	GP-COCCUS	C-	Y	BUG+B	Air	30
186	**Leuconostoc citreum**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
187	**Leuconostoc fallax**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
188	**Leuconostoc gelidum**	GP-COCCUS	C-	Y	BUG+B	Air	30
189	**Leuconostoc lactis**	GP-COCCUS	C-	Y	BUG+B	Air	30
190	**Leuconostoc mesenteroides**	GP-COCCUS	C-	Y	BUG+B	Air	30
191	**Leuconostoc mesenteroides ss dextranicum**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
192	**Leuconostoc mesenteroides ss mesenteroides**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
193	**Listeria grayi**	GP-ROD	C+	Y	BUG+B	Air	35-37
194	**Listeria innocua/monocytogenes/seeligeri/welshimeri**	GP-ROD	C+	Y	BUG+B	Air	35-37

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	Species Name	Type	Test	Thio	Medium	Atm	Temp
195	**Listeria ivanovii**	GP-ROD	C+	Y	BUG+B	Air	35-37
196	**Listeria ivanovii ss londoniensis**	GP-ROD	C+	Y	BUG+B	Air	35-37
197	**Listeria monocytogenes/innocua/seeligeri/welshimeri**	GP-ROD	C+	Y	BUG+B	Air	35-37
198	**Listeria seeligeri/innocua/monocytogenes/welshimeri**	GP-ROD	C+	Y	BUG+B	Air	35-37
199	**Listeria welshimeri/innocua/monocytogenes/seeligeri**	GP-ROD	C+	Y	BUG+B	Air	35-37
200	**Macrococcus bovicus**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
201	**Macrococcus carouselicus**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
202	**Macrococcus caseolyticus**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
203	**Macrococcus equipercicus**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
204	**Microbacterium arborescens**	GP-ROD	C+/-	Y	BUG+B	Air	35-37
205	**Microbacterium esteraaromaticum**	GP-ROD	C+/-	Y	BUG+B	Air	35-37
206	**Microbacterium flavescens**	GP-ROD	C+/-	Y	BUG+B	Air	35-37
207	**Microbacterium imperiale**	GP-ROD	C+/-	Y	BUG+B	Air	35-37
208	**Microbacterium lacticum**	GP-ROD	C+/-	Y	BUG+B	Air	35-37
209	**Microbacterium laevaniformans**	GP-ROD	C+/-	Y	BUG+B	Air	35-37
210	**Microbacterium liquefaciens**	GP-ROD	C+/-	Y	BUG+B	Air	35-37
211	**Microbacterium maritypicum**	GP-ROD	C+/-	Y	BUG+B	Air	30
212	**Microbacterium saperdae**	GP-ROD	C+/-	Y	BUG+B	Air	30
213	**Microbacterium terregens**	GP-ROD	C+/-	Y	BUG+B	Air	35-37
214	**Microbacterium testaceum**	GP-ROD	C+/-	Y	BUG+B	Air	35-37
215	**Microbacterium spp. (CDC.A-4)**	GP-ROD	C+/-	Y	BUG+B	Air	35-37
216	**Microbacterium spp. (CDC.A-5)**	GP-ROD	C+/-	Y	BUG+B	Air	35-37
217	**"Micrococcus diversus"**	GP-COCCUS	C+	Y	BUG+B	Air	30
218	**Micrococcus luteus**	GP-COCCUS	C+	Y	BUG+B	Air	30
219	**Micrococcus lylae**	GP-COCCUS	C+	Y	BUG+B	Air	30
220	**Paenibacillus azotofixans**	GP-ROD SB	C-	N	BUG+M	Air	30
221	**Paenibacillus larvae ss larvae**	GP-ROD SB	C-/W+	N	BUG+M	Air	30
222	**Paenibacillus macerans**	GP-ROD SB	C-/W+	N	BUG+M	Air	30
223	**Paenibacillus pabuli**	GP-ROD SB	C-/W+	N	BUG+M	Air	30
224	**Paenibacillus polymyxa**	GP-ROD SB	C-/W+	N	BUG+M	Air	30
225	**Paenibacillus popilliae**	GP-ROD SB	C-	N	BUG+M	Air	30
226	**Paenibacillus validus**	GP-ROD SB	C-/W+	N	BUG+M	Air	30
227	**Pediococcus acidilactici/parvulus**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
228	**Pediococcus dextrinicus**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
229	**Pediococcus pentosaceus**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
230	**Pediococcus urinaeequi**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
231	**Pediococcus urinaeequi-like**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
232	**Rathayibacter rathayi**	GP-ROD	C+	N	BUG	Air	30
233	**Rathayibacter tritici**	GP-ROD	C+	N	BUG	Air	30
234	**Rhodococcus australis**	GP-ROD	C+	Y	BUG+B	Air	35-37
235	**Rhodococcus coprophilus**	GP-ROD	C+	Y	BUG+B	Air	35-37
236	**Rhodococcus equi**	GP-ROD	C+	Y	BUG+B	Air	35-37
237	**Rhodococcus erythropolis**	GP-ROD	C+	Y	BUG+B	Air	35-37
238	**Rhodococcus fascians**	GP-ROD	C+	Y	BUG+B	Air	35-37
239	**Rhodococcus globerulus**	GP-ROD	C+	Y	BUG+B	Air	35-37
240	**Rhodococcus rhodnii**	GP-ROD	C+	Y	BUG+B	Air	35-37
241	**Rhodococcus rhodochrous**	GP-ROD	C+	Y	BUG+B	Air	35-37
242	**Rhodococcus ruber**	GP-ROD	C+	Y	BUG+B	Air	35-37
243	**Rothia dentocariosa**	GP-ROD	C+/-	Y	BUG+B	Air	35-37
244	**Rothia mucilaginosa**	GP-COCCUS	C-/W+	Y	BUG+B	Air	35-37
245	**Sanguibacter inulinus**	GP-ROD	C+	Y	BUG+B	6.5%CO2	35-37
246	**Sanguibacter keddieii**	GP-ROD	C+	Y	BUG+B	Air	30
247	**Sanguibacter suarezii**	GP-ROD	C+	Y	BUG+B	Air	30
248	**Staphylococcus arlettae**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
249	**Staphylococcus aureus ss aureus**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
250	**Staphylococcus aureus ss anaerobius**	GP-COCCUS	C-	Y	BUG+B	Air	35-37
251	**Staphylococcus auricularis**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
252	**Staphylococcus capitis**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
253	**Staphylococcus caprae**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
254	**Staphylococcus carnosus**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
255	**Staphylococcus chromogenes**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
256	**Staphylococcus cohnii**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
257	**Staphylococcus delphini**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
258	**Staphylococcus epidermidis**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
259	**Staphylococcus equorum**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
260	**Staphylococcus felis**	GP-COCCUS	C+	Y	BUG+B	Air	35-37

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	Species Name	Type	Test	Thio	Medium	Atm	Temp
261	**Staphylococcus gallinarum**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
262	**Staphylococcus haemolyticus**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
263	**Staphylococcus hominis**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
264	**Staphylococcus hominis ss novobiosepticus**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
265	**Staphylococcus hyicus**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
266	**Staphylococcus intermedius**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
267	**Staphylococcus kloosii**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
268	**Staphylococcus lentus**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
269	**Staphylococcus lugdunensis**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
270	**Staphylococcus lutrae**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
271	**Staphylococcus muscae**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
272	**Staphyloccocus pasteuri**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
273	**Staphylococcus piscifermentans**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
274	**Staphylococcus pulvereri/vitulinus**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
275	**Staphylococcus saprophyticus**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
276	**Staphylococcus schleiferi**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
277	**Staphylococcus sciuri**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
278	**Staphylococcus sciuri ss rodentium**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
279	**Staphylococcus simulans**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
280	**Staphylococcus warneri**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
281	**Staphylococcus xylosus**	GP-COCCUS	C+	Y	BUG+B	Air	35-37
282	**Streptococcus acidominimus**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
283	**Streptococcus agalactiae (GP B)**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
284	**Streptococcus alactolyticus**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
285	**Streptococcus anginosus**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
286	**Streptococcus bovis (GP D)**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
287	**Streptococcus canis**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
288	**Streptococcus constellatus**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
289	**Streptococcus criceti**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
290	**Streptococcus cristatus**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
291	**Streptococcus downei**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
292	**Streptococcus dysgalactiae ss dysgalactiae**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
293	**Streptococcus dysgalactiae ss equisimilis**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
294	**Streptococcus equi ss equi**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
295	**Streptococcus equi ss zooepidemicus (GP C)**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
296	**Streptococcus equinus (GP D)**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
297	**Streptococcus ferus**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
298	**Streptococcus gallolyticus**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
299	**Streptococcus gordonii**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
300	**Streptococcus hyointestinalis**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
301	**Streptococcus hyovaginalis**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
302	**Streptococcus infantis**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
303	**Streptococcus infantarius ss coli**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
304	**Streptococcus infantarius ss infantarius**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
305	**Streptococcus iniae**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
306	**Streptococcus intermedius**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
307	**Streptococcus intestinalis**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
308	**Streptococcus macacae**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
309	**Streptococcus macedonicus**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
310	**Streptococcus mitis**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
311	**Streptococcus mutans/ratti**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
312	**Streptococcus oralis**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
313	**Streptococcus parasanguinis**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
314	**Streptococcus peroris**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
315	**Streptococcus phocae**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
316	**Streptococcus pluranimalium**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
317	**Streptococcus pneumoniae**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
318	**Streptococcus porcinus**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
319	**Streptococcus pyogenes (GP A)**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
320	**Streptococcus salivarius**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-**37**
321	**Streptococcus sanguinis**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
322	**Streptococcus sobrinus**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
323	**Streptococcus suis (GP RST)**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
324	**Streptococcus suis serogroup 1/2**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
325	**Streptococcus suis serogroup 4/6**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
326	**Streptococcus suis serogroup 5**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37

† Agricultural bacteria that maybe grown on Bug without load.
** Found n the Dangerous Pathogen database

	Species Name	Type	Test	Thio	Medium	Atm	Temp
327	**Streptococcus suis serogroup 7**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
328	**Streptococcus thoraltensis**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
329	**Streptococcus uberis**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
330	**Streptococcus vestibularis**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
331	**Streptococcus waius**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
332	**Tetragenococcus halophilus**	GP-COCCUS	C-	Y	BUG+B	Air	30
333	**Tsukamurella inchonensis**	GP-ROD	C+	Y	BUG+B	Air	35-37
334	**Tsukamurella paurometabola**	GP-ROD	C+	Y	BUG+B	Air	35-37
335	**Turicella otitidis**	GP-ROD	C+	Y	BUG+B	Air	35-37
336	**Vagococcus fluvialis**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
337	**Vagococcus lutrae**	GP-COCCUS	C-	Y	BUG+B	6.5%CO2	35-37
338	**Vagococcus salmoninarum**	GP-COCCUS	C-	Y	BUG+B	Air	26
339	**Virgibacillus pantothenticus**	GP-ROD SB	C-/W+	N	BUG+M	Air	30

† Agricultural bacteria that maybe grown on Bug without load.
** Found n the Dangerous Pathogen database

Appendix 4: Program ID Printout

Reader printout (sample)

```
1➔  Program          : OmniLog - ID 1.1  ( FG rev C / Win 95)
2➔  Reader SN        : 120
    Operator         : read : Restricted Access Mode
3➔  Worksheet        : IDS_120_020313_A
    Read Mode        : Normal ID Mode
4➔  Setup Time       : Mar 13 2002 2:45 PM
5➔  Read Time        : Mar 14 2002 12:32 PM
    Read Hour        : 22
6➔  Position         :  2-B
    Plate Type       : GN2
    Strain Type      : GN-NENT OXI-
7➔  Sample Number    : 984
    Strain Name      : aci bau gen 2
    Strain Number    :
    Other            :
8➔  Database         : Biolog
9➔  DB File          : C:\OMNILOG_ID_11\GN601.KID
    +/v/- Reactions  : 38 / 5 / 53
    Data State       : OK
    Original Source  : Reader          Reader Type     : OmniLog
10➔ Current Source   : Original
    Edit Status      : OK              Record Frozen   : Yes
    Data Modifier    : N/A             Modify Date     : N/A
    Parent File      : N/A
    Key     <X> : Positive  {X} : Borderline  X : Negative  -X : Less Than Al
11➔         <X- : Positive, ID Negative       X+: Negative, ID Positive
          1    2    3    4    5    6    7    8    9   10   11   12
      +-------------------------------------------------------------
    A |   0   62   46   70 <169><222>  45   -2   13 <340>  55   43
    B |  56    6   -2 { 88}  39 {104}  -4   -4   -3   -1   -3 { 98}
    C |  15   -3   14   -3   -4   11   -5   -3   -3    2 <306><160>
12➔ D |<166><361><340>  55   -2   -4   -3   -5   -2 <234><322>  27
    E |  13   21 <264><318><136><300><165><196><201><341><244><251>
    F |<226>  56+<124>  22 <240><286><139-<323><314><341>  -2   16
    G |<272><320><146>  -2 <226><295><287>   2 { 92}<213>  51 <284>
    H |<308>  13   -3    9   16 <341>  24 {100}  -3   -3   -2   11
13➔         => Species ID : Acinetobacter baumannii/genospecies 2 <=

          SPECIES                                    PROB  SIM    DIST  TYPE
14➔ 1=> ) Acinetobacter baumannii/genospecies 2      100   0.857  2.13  GN-NENT OXI-
    2   ) Acinetobacter calcoaceticus/genospecies      0   0.000  4.96  GN-NENT OXI-
    3   ) Acinetobacter calcoaceticus/genospecies      0   0.000  5.85  GN-NENT OXI-
    4   ) Acinetobacter calcoaceticus/genospecies      0   0.000 10.59  GN-NENT OXI-
    5   ) Acinetobacter genospecies 14                 0   0.000 11.86  GN-NENT OXI-
    6   ) Pseudomonas viridilivida                     0   0.000 12.38  GN-NENT OXI-
    7   ) Pseudomonas alcaligenes                      0   0.000 14.47  GN-NENT
    8   ) Burkholderia pyrrocinia                      0   0.000 15.64  GN-NENT OXI-
    9   ) Pseudomonas fluorescens biotype G            0   0.000 15.85  GN-NENT
    10  ) Acinetobacter johnsonii/genospecies 7        0   0.000 16.46  GN-NENT OXI-
    Read Errors      : No Errors
    Plate Errors     : No Errors
15➔ General Errors   : No Errors
    Temp Errors      : No Errors
    Print Time       : Mar 14 2002 12:43 PM
```

Reader and Saved File Modes Printout Key

1. Software version
2. Operator / Does user have Unrestricted Access to Software?
3. Worksheet file name
4. Time MicroPlate was setup.
5. Time MicroPlate was read for ID.
6. MicroPlate Position
7. Sample identifiers
8. Name of database searched
9. Number of positive, borderline, and negative reactions
10. If the printout is from a saved file, this entry lists file name, position of the entry in the file, and edit status.
11. Reaction Key
12. Numbers seen in each well is the Color Intensity Values. Positive (<>), borderline ({}), and negative reactions (no brackets). Numbers with no brackets and a plus (+) on the right side are mismatches. The well read as negative, but at least 80% of the strains of that organism tested in our database were positive for that well. Numbers with a < on the left and a minus (–) on the right are also mismatches, but the well read as positive, while the strains in our database were mostly negative for that well. Numbers with a minus (-) to the left of the well value mean that the well's OD was less than the OD of the control well.
13. Species Identification/ #1 identification
14. #2-9 choices
15. Error Listing

Appendix 5: Dangerous Pathogen (DP) Database

Biolog makes a supplemental database for species falling into a category called Dangerous Pathogens (e.g., the organisms that generally require BL2-BL3 handling protocols). If your laboratory is testing for these pathogens, you will know in advance if any samples are suspected of containing these organisms. Follow the instructions in the body of this user guide. As appropriate, also follow the special procedures listed here.

Safety Considerations

To comply with government safety regulations[2] use Biosafety Level 2 (BL2) methods, containment equipment, and facilities. Immunization of laboratory personnel may be required if frequent work with clinical specimens or diagnostic cultures is performed.

It is recommended that Biosafety Level 3 (BL3) practices, containment equipment, and facilities are used for work involving production volumes or concentration of cultures, and for activities that have a high potential for aerosol production. In these facilities, immunization is recommended for all persons working with the agent, all persons working in the same laboratory room where the cultures are handled, and all persons working with infected animals.

Special Procedures for Dangerous Pathogens

For the most part, you will prepare, read, and interpret these samples exactly as described throughout this manual. There are, however, a few exceptions. Table 16-1 lists the special procedures required for dangerous pathogens.

[2] Biosafety in Microbiological and Biomedical Laboratories, U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, and National Institutes of Health, Fourth Edition, May 1999.

TABLE 13-1: PROCEDURE EXCEPTIONS FOR DANGEROUS PATHOGENS

Organism	Special Procedures
Bacillus anthracis	Follow special precautions and the procedure outline on page -------- for Bacillus species Grow on BUG+Maltose agar media. **Do not add Thioglycolate to GN/GP IF**
Brucella melitensis *(Use this procedure for all species of Brucella that have been reclassified as Brucella melitensis : B. abortus; B .canisB.melitensis; B suis)*	Set up as Gram Negative Fastidious organism. Grow in Chocolate agar media, CO2 atmosphere. **Do not add Thioglycolate to GN/GP IF**
Burkholderia mallei *Burkholderia pseudomallei*	Set up as Gram negative Non-Enteric organism. Grow in BUG+Blood (Do not use TSA+Blood). **Do not add Thioglycolate to GN/GP IF**
Francisella tularensis	Set up as Gram Negative Fastidious organism. Grow in Chocolate agar media, CO2 atmosphere. **Do not add Thioglycolate to GN/GP IF**
Yersinia pestis	Set up as Gram negative Non-Enteric organism. Grow in BUG+Blood (Do not use TSA+Blood). **Do not add Thioglycolate to GN/GP IF**

Special precautions should be taken when handling this group of organisms. Processing specimens suspected to contain one of the above selected agents should only be handle by trained personnel under BSL2 for specimen processing, BSL 3 for culture manipulation. PRESUMPTIVE identifications with OmniLog stations should be interpreted with caution. Please contact the local State health Department or CDC for confirmation of identification.

References: Bioterrorism: Implications for the Clinical Microbiologist
Wolfgang F.Klietmann, et al
Clinical Microbiology Reviews Vol 14, 2001, p 364-381

CDC contacts: www.bt.cdc.gov
www.cdc.gov/ncidod/hip
CDC Emergency Response phone number (770) 488-7100